PUBLIC HEALTH REPORTS

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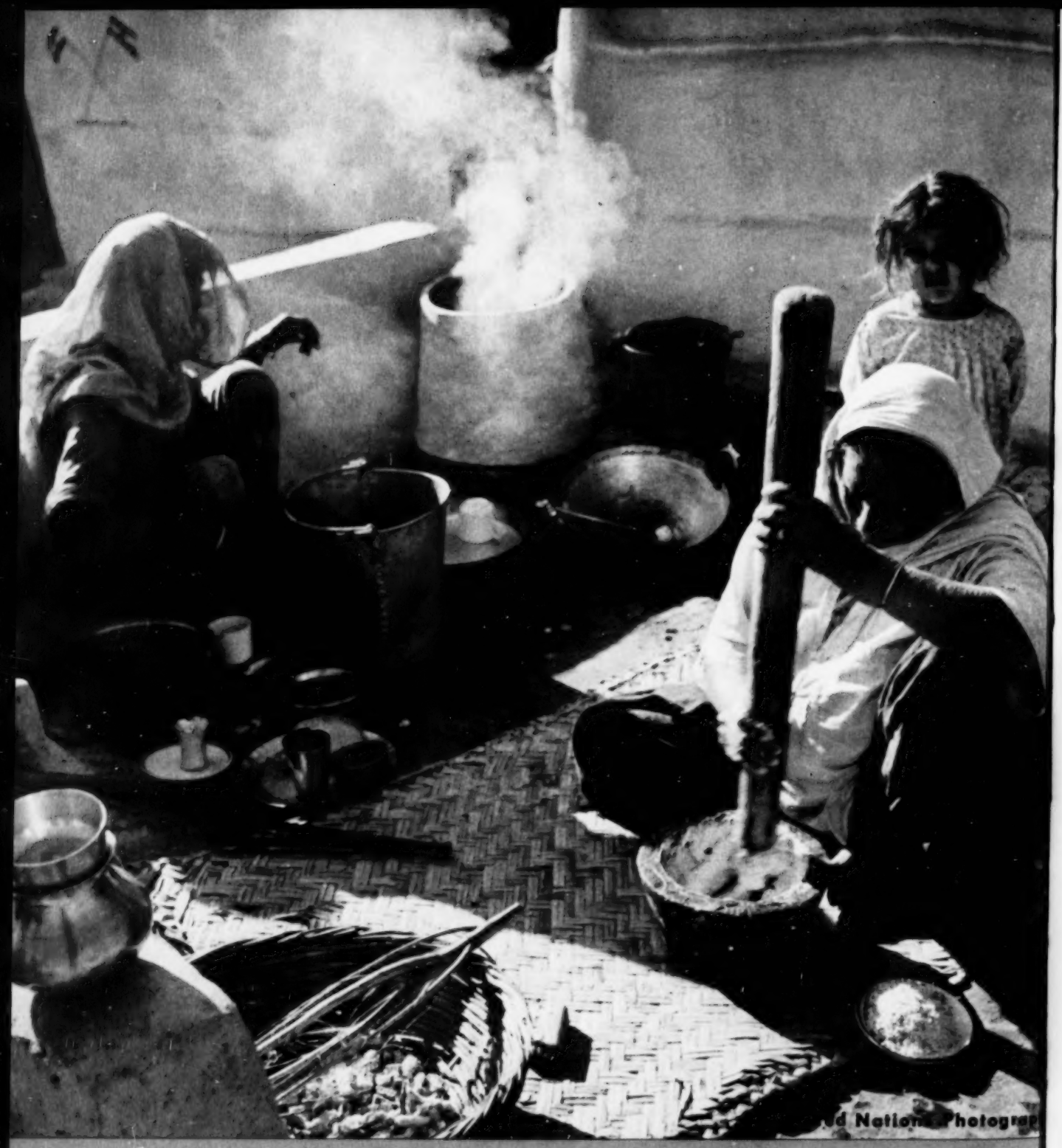
Public Health Service



World Health Day - April 7

food and health

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frontispiece

A woman in India mixes dough for chappatis, thin flat cakes of unleavened bread. These and an urn of goat's milk will be served on the family's return from work.

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Jerry Solon, Dean W. Roberts, Dean E. Krueger and Anna Mae Baney.

58 pages; illustrated. A summary and information on availability appear on pages 279–281.

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U. S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
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Methemoglobinemia From Eating Meat With High Nitrite Content

By J. D. ORGERON, M.P.H., J. D. MARTIN, M.D., C. T. CARAWAY, D.V.M., ROSE MARY MARTINE, B.S., and GEORGE H. HAUSER, M.D.

TEN CASES of methemoglobinemia occurred near New Orleans, La., in October 1955. From epidemiological and laboratory investigations, we determined that they were due to nitrite poisoning which resulted from eating wieners and bologna containing large amounts of the chemical.

Before detailing the circumstances of the outbreak, we shall review briefly the medical aspects of methemoglobinemia and consider the use of nitrites in meat.

Methemoglobin in the Blood

Methemoglobinemia is a condition in which a part of the hemoglobin has been oxidized to methemoglobin with a consequent reduction in the oxygen-combining and oxygen-carrying power of the blood. The oxidation may be caused by absorption, inhalation, or ingestion of large doses of certain chemicals, particularly the nitrites, nitrates, sulfonamides, and aniline derivatives.

Onset of symptoms is sudden, usually within 1 or 2 hours after contact with, or ingestion of, the poison. The symptoms include nausea, vomiting, profuse sweating, and an intense cyanosis of the fingertips, nose, and ears.

Mild cases of methemoglobinemia result when less than 50 percent of the hemoglobin is oxidized to methemoglobin. After 70 to 80 percent is oxidized, there is a progression of ataxia, dyspnea, excessive salivation, prostration, and unconsciousness. Oxidation of 90 percent or more is fatal unless immediate treatment is given (*1*).

A presumptive diagnosis of methemoglobinemia should be made if there is a history of rapid onset of cyanosis without physical findings of cardiac, pulmonary, or intracranial disorder. A history of ingestion of a substance containing nitrites or nitrates within the past few hours aids in establishing the diagnosis. If cyanosis is unrelieved by oxygen therapy and if blood withdrawn from a vein shows the characteristic chocolate-brown coloration, the diagnosis is almost certain (*2*).

A definitive diagnosis of methemoglobinemia can be made with the laboratory procedure reported by Evelyn and Malloy (*3*). This procedure, which uses a single sample of blood from the finger, is an accurate photoelectric method of determining the oxyhemoglobin, methemoglobin, and sulfhemoglobin levels of the blood.

Methylene blue is an effective antidote for toxic methemoglobinemia. The recommended dosages are 1 mg. of methylene blue per kilogram of body weight for adults and 2 mg. of methylene blue per kilogram of body weight for children. These amounts should be injected

Mr. Orgeron, Dr. Martin, Dr. Caraway, and Miss Martine are members of the epidemiology team, Louisiana State Department of Health. Mr. Orgeron is a sanitarian epidemiologist, Dr. Martin is chief of the epidemiology section, Dr. Caraway is a veterinary epidemiologist, and Miss Martine is a nurse epidemiologist. Dr. Hauser is director of the division of laboratories and acting director of the division of food and drugs and the chemical-toxicological laboratory of the health department.

intravenously over a 5-minute period. Dosages should not exceed 7 mg. per kilogram since toxic effects such as dyspnea, precardial pain, restlessness, a sense of oppression, apprehension, and fibrillar tremors may occur (*1*).

Numerous cases of methemoglobinemia have been traced to the consumption of well water containing large amounts of nitrates (*4–7*), contact with aniline dyes used in crayons (*8–11*) and laundry marking ink (*12, 13*), accidental ingestion of leather dyes and furniture polish (*2*), and ingestion or absorption of varied medications containing hemoglobin oxidizing components (*14–16*). Only a few outbreaks have been reported in which the causative agent was contained in food. One of these was an outbreak in New York City in which 11 aged men who had eaten breakfast at the same cafeteria were affected. Investigation showed that sodium nitrite was used in place of table salt in the seasoning of the oatmeal they had eaten (*17*). Another was an outbreak of acute toxic methemoglobinemia among a group of people who had eaten wheatcakes and "maple sirup" at a diner in Syracuse, N. Y. In this outbreak, investigation revealed that a commercially prepared corning extract containing 8 percent nitrites, 4 percent nitrates, and sucrose was inadvertently served as maple sirup to the affected individuals (*18*).

Nitrites in Meat

Nitrites and nitrates are used in curing meats mainly because of their color-fixing qualities, although these substances also have some preservative properties. When added to meat, sodium nitrate (Chile saltpeter) or potassium nitrate (saltpeter) is reduced to the corresponding nitrite by the action of certain bacteria that occur naturally in the meat and on processing equipment. The nitrites are further broken down by hydrolysis to form nitric oxide. This simple compound combines with the muscle hemoglobin (myoglobin) of the meat to form a more permanent pink substance, nitric oxide myoglobin. This pigment is more stable than the natural pigment found in blood and muscle fibers and is also more resistant to the action of air, heat, and bacteria (*19*).

Federal meat regulations and most of the State food and drug regulations prohibit the use of more than 200 p.p.m. of nitrite in meat products for human consumption. These regulations also require that products containing nitrates and nitrites be labeled to that effect.

The amount of nitrite that can be utilized by meat is limited by the amount of myoglobin originally in the muscle tissues. The addition of excessive amounts of nitrites will not increase or intensify the color, but it may have an adverse effect on the meat.

Circumstances of the Outbreak

The Louisiana State Department of Health first learned of the outbreak of methemoglobinemia in the New Orleans area from a report of two cases from a practicing pediatrician.

The first patient was a 2-year-old girl who became ill about 2 hours after eating 2 wieners. Symptoms, as observed by the child's mother, included profuse sweating, vomiting, and a bluish-gray cyanosis around the lips and nails. The family physician was called immediately, and the child was hospitalized with a presumptive diagnosis of methemoglobinemia. The child responded well to an intravenous injection of methylene blue and was discharged from the hospital the following day.

Specimens of the vomitus, which contained particles of wieners, and samples of wieners obtained from the same package from which the meal was prepared were submitted to the chemical-toxicological laboratory of the State health department for determination of the nitrite content. Chemical analysis showed that the vomitus contained 11.8 p.p.m. of nitrite and that the wieners contained 5,420 p.p.m. of nitrite.

The following day the second case of methemoglobinemia was reported in a 3-year-old boy. Speech disturbance and cyanosis of the lips and nails were observed about 2 hours after the child had eaten 2 wieners manufactured by the same meat plant that prepared the ones eaten by the first patient. The child recovered rapidly after hospitalization and treatment with methylene blue injected intravenously. Samples of the wieners obtained from the same package as those eaten by this child contained 5,420 p.p.m. of nitrite.

The remaining 8 patients exhibited symptoms similar to the first 2, and all responded well to treatment with methylene blue. Seven had eaten wieners and one had eaten bologna, all manufactured at the same plant.

Of the 10 persons ill in this outbreak, 8 were between the ages of 1½ and 5 years. For this group the interval between eating the meat and onset of symptoms was 2 hours. The other 2 patients were 10-year-olds, and the time lapse between eating the meat and onset of symptoms was about 6 hours.

Inspection of the Plant

After the report of the third case and the finding of excessive quantities of nitrite in the wieners, State and local health department sanitarians were notified to place under seizure all retail stocks of wieners manufactured by the meat plant in question. Later, when the case in which bologna appeared to be the cause was reported, some retail stocks of bologna manufactured by this plant were also seized. One or more samples from each lot of meat placed under seizure were sent to the State chemical-toxicological laboratory for nitrite determinations.

In 131 samples of the assorted meat products, nitrite concentrations varied from 3.3 p.p.m. to 6,570 p.p.m. Seventeen of the samples (14 of wieners and 3 of bologna) contained nitrites in excess of the maximum allowable of 200 p.p.m. The lots from which these samples were taken were destroyed by burning.

In an effort to determine the conditions responsible for the excessive amounts of nitrites in these meat products, we subsequently made an inspectional tour of the manufacturing plant. (This plant does not use Federal, State, or local meat inspection services.) The general manager and the sausage production manager of the plant explained each operation in the wiener and bologna manufacturing process, with particular emphasis on the mixing and blending operations.

In preparing wieners or bologna, approximately 400 pounds of coarsely ground meat and meat products are added to a silent cutter, along with ice for cooling, a prepackaged spice preparation, and 1.5 pounds of a commercially prepared powder containing nitrite and nitrate. This powder is composed of approximately 6 percent sodium nitrite, 4 percent sodium nitrate, 87 percent sodium chloride, and 3 percent moisture. After 12 to 20 minutes in the silent cutter, the material is conveyed to the stuffing room, where the artificial casings are filled. Samples of the artificial casing contained only a trace of nitrite.

During our inspection of the spice storage room, we noticed an unopened container of "pure" sodium nitrate powder. On close questioning concerning the use of this powder, the sausage production manager stated that this material was just recently obtained. The commercially prepared nitrite-nitrate powder produced too fast a "cure" on some products, he explained, and he had ordered the "pure" sodium nitrate to correct this difficulty. He knew of no "pure" sodium nitrate compounds ever having been used in the plant.

Since the commercially prepared powder contained only 10 percent sodium nitrite and sodium nitrate, about 36 to 40 pounds of this material would have to be added to a 400-pound batch of meat to provide the concentration of 6,570 p.p.m. found in one sample of wieners. The amount of sodium chloride contained in 36 to 40 pounds of the commercial preparation would have made the wieners very distasteful. Hence, it would seem that a product containing a larger concentration of nitrate or nitrite (or both) than the powder would have had to be used to result in the quantities of nitrite reported by the laboratory.

After our tour of the plant, we obtained information regarding personnel changes during recent months, disposition of broken and imperfect wieners, records of nitrite and nitrate inventories, and routine laboratory controls on the meat products. Investigations of these items, however, did not help us determine how the excessive quantity of nitrite got into the wieners and bologna.

Many safeguards were taken to insure the accuracy of the chemical analyses. Two laboratories in addition to the State chemical-toxicological laboratory analyzed samples of the meat products, and all found similar nitrite concentrations. Laboratory examination of the commercially prepared powder used at the

plant indicated that it did not contain more than the 10 percent sodium nitrite and sodium nitrate indicated on the label. The salt content of the wieners manufactured by the plant was found to be within normal limits.

Laboratory analysis of samples of wieners manufactured by other plants using the same commercial nitrite-nitrate preparation did not show the excessive amounts of nitrites found in the products of the plant under suspicion.

Bacteriological examination of samples of the suspected meat products did not reveal any organisms of the food-poisoning type.

Although we were unable to determine exactly how the additives were applied to the meat products to result in the excessive concentrations of nitrite, it seems most likely that a product containing a large quantity of nitrate or nitrite (or both) was mistakenly added to one or more batches of the wiener and bologna mixtures. Since the inventory controls of the additives were haphazard and the code dating of the meat products was unreliable, we were unable to learn the date that the incident occurred. Had this information been available, we could have directed our investigations to the events of the day in question.

Summary and Conclusion

In October 1955, an outbreak of 10 cases of methemoglobinemia occurred in the New Orleans, La., area. Early evidence pointed to the ingestion of large amounts of nitrite in wieners and bologna as the cause.

Investigation revealed that 9 victims had eaten wieners and 1 had eaten bologna manufactured by the same plant. Laboratory analysis of 131 samples from retail stocks of meat products manufactured by this plant indicated that 17 samples contained nitrite concentrations in excess of 200 p.p.m., the maximum amount permissible under Federal and State regulations. The concentrations ranged up to 6,570 p.p.m. A commercially prepared powder containing 10 percent sodium nitrite and sodium nitrate was used routinely in preparing the wieners and bologna.

Exactly how the excessive quantity of nitrite got into the meat products could not be determined. It seems likely, however, that a product containing a larger quantity of nitrate or nitrite (or both) than the commercially prepared powder had been added by mistake to one or more batches of the wiener and bologna mixtures.

This outbreak demonstrates the need for effective meat inspection services in all meat packing plants. An official meat inspection program should be the aim and eventual goal of every State and municipality. In the meantime, all owners and employees of meat plants should be made aware of the dangers of careless handling of nitrates, nitrites, and other chemical additives.

• • •

Since the occurrence of this outbreak, a similar incident was reported in Florida. Two children, a 4-year-old boy and a 15-month-old girl, from the same household became ill after eating uncooked wieners. The subsequent death of the 4-year-old child has been attributed to eating the uncooked wieners.

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techniques

Soda Fountain School

Employees of Cleveland's 600 drug stores will be trained at the School of Soda Fountain Sanitation operated in the city hall by the Cleveland Division of Health. Graduates will receive a food-handler's button to wear on their uniforms.

Designed to reduce the need for enforcement of sanitary regulations, the school's short course combines audience participation, group discussion, and role playing in four 2-hour sessions. Students are told and shown why a clean, colorful fountain will attract new customers, establish a regular clientele, increase sales for the drug store, and add pennies to their own pockets.

Classes began January 2, 1957. They are open to fountain employees of independent and chain stores throughout the Cleveland area in first-come, first-served order. Owner-manager representatives of the drug stores are encouraged to attend at times not used by their employees. Eventually, the course will be offered to applicants attending high school.

The classroom seats 35. To one side is a fully equipped luncheonette, complete with mechanical dishwashing, refrigeration, and cooking facilities. All of the equipment has been donated by manufacturers and associations. Teaching aides include motion pictures, slides, flip charts, bulletin boards, pamphlets, checklists, and self-inventory sheets. Three regular and two guest instructors conduct the classes and give everyone individual attention when needed.

On completing the course, each graduate receives a permanent number, a card, and a button. Some of the stores have agreed not to employ new help until they have earned the food-handler's button.

Every store sending all of its employees through the course receives a certificate for public display if it also has had no sanitary violations. The certificate is revokable when violations are found.

Evidence that the content and emphasis of a syphilis control program has a greater influence over the number of cases reported than does the rise and fall in the rate of infection is adduced by one State's experience. In Montana, State board of health field work and central office efforts materially increased the number of current cases reported.

Syphilis Morbidity Reporting in Montana, 1950–54

By ARCH B. CLARK, G. D. CARLYLE THOMPSON, M.D., M.P.H., and FLORENCE KEHR, M.A.

THE MOST commonly employed measure of the incidence of syphilis within each reporting jurisdiction is the number of cases reported for the first time to State health departments. While morbidity reports comprise the principal State-by-State criterion for determining trends in the incidence of disease and evaluating public health programs, there is ample evidence that the number of cases of syphilis reported over a given period oftentimes is influenced more by the content and emphasis of the control program than by a rise or fall in the rate of infection. A classic example of this is the abrupt rise in reported cases of early latent syphilis during mobilization for World War II. The results of serologic tests for syphilis performed as part of selective service examination were directly responsible for the increased reporting of this disease.

Dramatic swings in reported morbidity such as those resulting from selective service examinations are easy to detect and interpret. It is the subtle influence of local changes in program content and emphasis upon morbidity reporting which is difficult or impossible to detect through the routine analysis of morbidity reports. Because of the unknown factors, reported morbidity is, at best, only a crude index of trends in the control of syphilis within an individual State. Consequently, by themselves, these data may not be considered a reliable index upon which to base the program needs of a single jurisdiction.

No qualified observer will question that real progress has been made, particularly in the past 10 years, in the control of syphilis in the United States. However, just how much of the recent downward trend in reported morbidity reflects declining incidence, "underreporting" of known cases, and case-finding failures is still a matter of speculation.

A decline in reported morbidity may result from one or more of the following factors:

1. An absolute drop in incidence or prevalence, or both.
2. A reduction in the number of infected persons seeking a diagnosis.
3. A drop in the number of diagnosed cases reported.
4. A reduction in the direct epidemiological efforts to detect suspects.

Mr. Clark is health program representative and Mrs. Kehr is records adviser with the Public Health Service, Region 8. Dr. Thompson is executive officer and secretary, Montana State Board of Health, Helena.

A decline in the incidence of the venereal diseases would demonstrate effective control measures.

A reduction in the number of persons voluntarily seeking diagnosis for a venereal disease would indicate a decline in the index of suspicion on the part of the public. Such a decline might result from the conviction that venereal disease is no longer a problem.

A drop in the number of diagnosed cases reported and a reduction in direct epidemiological efforts to find suspects could result from reduced emphasis by health departments on all phases of the control programs. Reduced program content and emphasis, furthermore, may be measured by the amount or proportion of funds available to State and local health departments for venereal disease control. An analysis of the Montana central registry records demonstrated that this State's decline reflected incomplete reporting rather than true incidence. Renewed program emphasis, which included (*a*) the resumption of the former practice of mailing a confidential report form with all of the positive serologic reports and (*b*) resumption of visits to physicians to determine the diagnostic status of persons with positive serologic tests, resulted in an immedate increase in the number of reported cases.

In Montana, in July 1946, the venereal disease control program was given special emphasis under the direction of an epidemiologist trained in venereal disease control. The growing importance of this phase of the work of State and local health units was reflected by the amount of State and local funds directed toward venereal disease control. From $43,285 in the fiscal year 1947, funds increased to $52,823 in 1949. Beginning in fiscal year 1950, the total amount of funds from all sources for venereal disease control declined rapidly, and by 1954 the total amount expended was only $20,608, a decrease of 61 percent.

Table 1. Source and amount of funds budgeted for venereal disease control and number of cases of syphilis reported in Montana, fiscal years 1947–54

Fiscal year	Funds for venereal disease control			Number of cases of syphilis reported
	Federal grant	Estimated value of generalized services contributed at State and local levels	Total	
1947	$29, 300	$13, 985	$43, 285	489
1948	28, 400	20, 279	48, 679	682
1949	29, 300	23, 523	52, 823	494
1950	25, 600	25, 232	50, 832	291
1951	17, 900	32, 717	50, 617	187
1952	17, 300	26, 598	43, 898	185
1953	17, 300	21, 551	38, 851	125
1954	0	20, 608	20, 608	44

Table 2. Amount of funds from all sources available for support of State and local health departments and percentage budgeted for venereal disease control, Montana, fiscal years 1950–54

Fiscal year	Total funds all sources [1]	Amount allocated for venereal disease control
1950	$645, 115. 23	$50, 832
1951	730, 881. 71	50, 617
1952	767, 183. 83	43, 898
1953	839, 440. 05	38, 851
1954	836, 340. 39	20, 608

[1] Mental health excluded.

The number of reported cases of syphilis decreased from 291 in the fiscal year 1950 to 44 in fiscal year 1954, a decline of 84.9 percent. The amount and source of funds available for venereal disease control and the number of reported syphilis cases for fiscal years 1947–54 are shown in table 1. Table 2 shows the amount of all funds available to State and local health departments and the amount allocated to venereal disease control. The relation between the reduction in program emphasis and content as shown by the expenditure of funds and the decline in the number of syphilis cases reported is shown in figure 1.

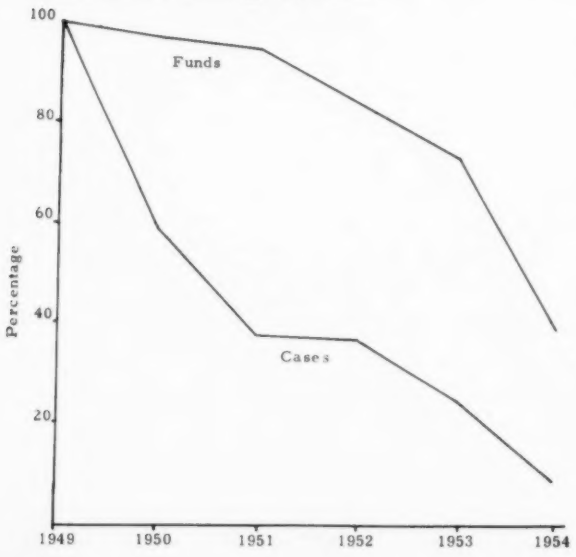
If nothing more were known about the number of persons in Montana who had positive diagnostic tests for syphilis, it could be assumed that the State health authorities were merely exercising good judgment in reducing the amount of funds devoted to this program in about the same proportion that the disease was declining within the State. However, other data accumulated by the Montana State Board

of Health demonstrate that the decline in reported morbidity of syphilis is more the result of under-reporting and case-holding failures—"suspects" who failed to remain under observation until a diagnosis had been established—than of a decrease in prevalence of this disease. Analysis of the State's morbidity reports and records of positive serologic tests for syphilis in the State laboratory demonstrates the amount of presumptive syphilis in Montana.

Central Registry

Since July 1, 1947, the Montana State Board of Health has required that all cases of syphilis be reported by name and address of the patient. Prior to this date, the regulations were satisfied by reporting cases by initials or case numbers. However, for many years it has been the practice of Montana physicians, clinics, or institutions, when sending specimens to the State laboratory for a serologic test for syphilis, to identify the donor of the specimen by full name and frequently by address and other identifying information. These two means—reporting cases by name and address and laboratory report forms which identify the person under observation by name and address—were used to prepare the "central registry" of syphilis "cases." This file was set up in July 1947 and was prepared from lists of all known cases of syphilis previously reported by name, to which were added the names of all individuals for whom positive serologic tests had been reported. New names were added routinely from incoming morbidity and laboratory reports.

Figure 1. Ratio between funds budgeted for venereal disease control in fiscal year 1949 and number of cases of syphilis reported in Montana during 1950–54.



Forms provided by the State laboratory to accompany specimens sent in for serologic tests requested, in addition to the name and address of the person, the "reason for test," that is, whether "premarital," "prenatal," "diagnostic," or "control of treatment." Whenever this information was supplied, it was also entered on the central registry card.

Once a central registry card was prepared, all subsequent information pertaining to the case was recorded on that card. For example, if the first information was a positive blood test, and a morbidity report was received later from a physician, the date of the morbidity report and the identification of the reporting physician were added to the card. Other information added from time to time over the last 7 years included such items as requests from physicians for shipment of antiluetic drugs, abstracts of correspondence relating to the case, and epidemiological information. Since central registry cards are prepared for named individuals only, duplicate cards are limited to those resulting from (*a*) gross differences in spelling of the same name on two or more original documents, or (*b*) changes in surnames of women upon marriage. The first source of error is probably a minor one because supplementary information, such as a city and street address, attending physician, and clinic or institution, was checked with the central registry card for phonetically similar names. Since the caseload is heavily weighted by males, the second source of error may also be minor.

Data for this paper were obtained by an analysis of all material on file in the State board of health as of April 30, 1954. A total of 3,521 central registry cards, all of which had been active since December 31, 1949, were tabulated. Cards which were active only during the period 1947–49 were excluded in order to reduce to a minimum the error resulting from the inability to collate cards for named individuals who had positive serologic tests

with cards for cases which had been reported by number or initials in 1946 or previous years. Undoubtedly there are a few Smiths and Joneses who actually were reported as cases by initials or number, 4 or more years ago, who are still receiving post-treatment serologic checks. However, since the average post-treatment observation period is probably considerably less than 3 years, the actual number of post-treatment cases taken into this study will not materially affect the overall results.

The 3,521 cases active during the period January 1, 1950–April 31, 1954, were classified as follows:

Diagnostic status	*Number*	*Percent*
A. Diagnosed cases reported by name on State confidential morbidity report card	671	19.1
By private physician	509	
By clinic, hospital, or institution	162	
B. Cases for which central registry cards showed that a positive diagnosis of syphilis had been made but case was otherwise unreported [1]	440	12.5
C. Two or more specimens examined, all tests positive	523	14.9
D. Single specimen examined, all tests of a battery positive	1,168	33.1
E. Single specimen examined with positive results and with at least one of battery of routine tests negative	561	15.9
F. Two or more specimens examined with both positive and negative results from combined battery of tests	158	4.5
Total	3,521	100.0

[1] Cards for this group included those marked "control of treatment," showing that drugs had been ordered or consultation regarding treatment had been recorded, or those indicating epidemiological evidence of infection. "Epidemiological evidence of infection" involved:

(*A*) Central registry cards noting that the person with a positive blood test had been named as a contact of a case of primary or secondary syphilis. This was considered "epidemiological evidence" provided (*a*) the person was in the sexually active age group and (*b*) the positive blood test was subsequent to the contact report.

(*B*) A central registry card identified a young person with a positive test for syphilis as the child of a syphilitic mother.

The distribution of these cases by calendar year is shown in table 3.

The data in table 3 fall into three major categories of two groups each: (*a*) "known" cases of syphilis, groups A and B; (*b*) probable cases, groups C and D; and (*c*) equivocal cases, groups E and F. The known cases include those for which a morbidity report has been received and those for which there is definite evidence of a diagnosis having been made. The probable cases include persons who have had one or more specimens examined for syphilis, with all tests of a battery positive and with no negative results. The equivocal cases include individuals whose serologic tests for syphilis, in addition to one or more positive reactions, resulted in one or more negative reactions. It is recognized that cases with false-positive results may be included in the probable group. On the other hand, the equivocal group, particularly group F, those with multiple STS, also must contain a significant percentage of treated but unreported cases.

It is impossible from the original data to determine the exact number of cases actually included in each of the last four categories. In order to take into consideration compensating errors in the data, when discussing morbidity reporting and case holding, the entire equivocal group has been dropped from the final analysis. It is assumed that the number of individuals with false-positive tests appearing in the "probable" group was no greater than the number of "cases" in the equivocal group. This seems to be a reasonable assumption inasmuch as the equivocal group comprises 20 percent of the total.

The total number of cases in the "known" (diagnosed) and probable categories are shown, as they occurred each year, in table 4. Also included is the number and percentage of cases within each group of these two categories. The percentage of cases in each one of these groups compared with the total cases in all groups is shown in table 5. It is evident that, had full advantage been taken of all diagnostic opportunities and had all cases been reported, some 3,050 cases of syphilis would have been reported during the 5-year period rather than 691 (table 4), a more than fourfold increase. The relationship between the cases actually reported and the potential number in the "known" group which might have been reported is shown in figure 2.

In 1950, more than 70 percent of the total

Table 3. Analysis of Montana syphilis central registry, by diagnostic status and date of latest information, January 1, 1950–April 30, 1954

Diagnostic status	Date of last information					
	1950	1951	1952	1953	January–April 1954	Total
Known:						
Group A—Morbidity report received	228	172	167	93	11	671
Group B—Morbidity report not received	95	127	85	97	36	440
Probable:						
Group C—2 or more STS [1] positive	130	115	87	130	61	523
Group D—Single STS positive	373	246	229	240	80	1, 168
Equivocal, positive, and negative STS:						
Group E—Single STS	191	114	144	84	28	561
Group F—Multiple STS	64	18	33	34	9	158
Total	1, 081	792	745	678	225	3, 521

[1] Serologic test for syphilis.

"known" cases, had actually been reported on a State confidential report form but this proportion rapidly decreased to 22.3 percent in early 1954 (table 4). When the total number of "known" cases is taken into consideration, the decline in syphilis in Montana since 1950 is much more moderate than is indicated by the State's morbidity reports. Comparative trends are shown in figure 3.

Case-Holding Failures

The "probable" group of syphilis cases is divided into two categories (table 4) those individuals who have two or more STS (classified as presumptive); and those who have had only a single specimen examined (classified as suspected). The number of individuals with a positive STS on a single specimen comprises approximately 70 percent of the entire probable group over the entire period. However, in 1950, 74.2 percent of the probable cases had a single specimen tested. In 1954, the percentage of probable cases having a single positive test was 62.9.

Although there has been a moderate decline in the proportion of cases in the probable group having only a single specimen tested for

Table 4. Number and percentage of persons observed for syphilis in Montana, according to known or probable syphilis status, 1950–54

Year	All groups	Known cases					Probable cases				
		Total	Group A (cases reported)		Group B (cases not reported)		Total	Group C (2 or more positive STS)[1]		Group D (single positive STS)[1]	
			Number	Percent	Number	Percent		Number	Percent	Number	Percent
1950	826	323	228	70. 6	95	29. 4	503	130	25. 8	373	74. 2
1951	660	299	172	57. 5	127	42. 5	361	115	31. 9	246	68. 1
1952	568	252	167	66. 3	85	33. 7	316	87	27. 5	229	72. 5
1953	560	190	93	48. 9	97	51. 1	370	130	35. 1	240	64. 9
1954	430	[2] 139	31	22. 3	[2] 108	77. 7	[2] 291	[2] 108	37. 1	[2] 183	62. 9
Total	3, 044	1, 203	691	57. 4	512	42. 6	1, 841	570	31. 0	1, 271	69. 0

[1] Serologic test for syphilis.
[2] Estimate for calendar year based on 4 months' experience.

NOTE: For full definitions of groupings, see text, page 197.

syphilis, particularly in the past 2 years, it is apparent that many of the 1,271 persons in this group simply failed to return to the physician for results of the first test or failed to keep appointments for subsequent evaluation. It is also assumed that very few of this group received therapy for syphilis. It is reasonably certain that some of these 1,271 individuals will develop syphilitic psychoses. They will continue to populate the State mental hospitals. Others will become cardiac invalids. These are the tragedies of late untreated syphilis.

Table 5 also shows the percentage of the total known and probable cases of syphilis made up by each of the above groups. The reported cases decline from a high of 29.4 percent in 1952 to 5.9 percent in 1954. The unreported diagnosed cases do not vary significantly from the 15.7 percent average. The probable cases with two or more specimen examinations average 18.7 percent of the entire probable group. This percentage varies from 15.3 percent in 1952 to 32.4 percent in 1954. The suspected cases with a single observation comprise 41.7 percent of the probable cases. This percentage does not vary significantly throughout the entire 4⅓ years.

It is a matter of public concern that the State health department has no knowledge of the final diagnoses for individuals in the probable group. It may be assumed that many of the rather constant number of individuals who have had two or more specimens examined with positive results have received a definitive diagnosis and have been placed under treatment. However, with such strong indications of infection, it is essential for the protection of each individual that he continue under medical observation until a diagnosis is completed. Furthermore, for the protection of the public health, persons who may be in the potentially infectious stages of syphilis should be interviewed for source of infection and names of contacts.

The total number of specimens examined in

Figure 2. Reported cases and known cases of syphilis in Montana, 1950–54.

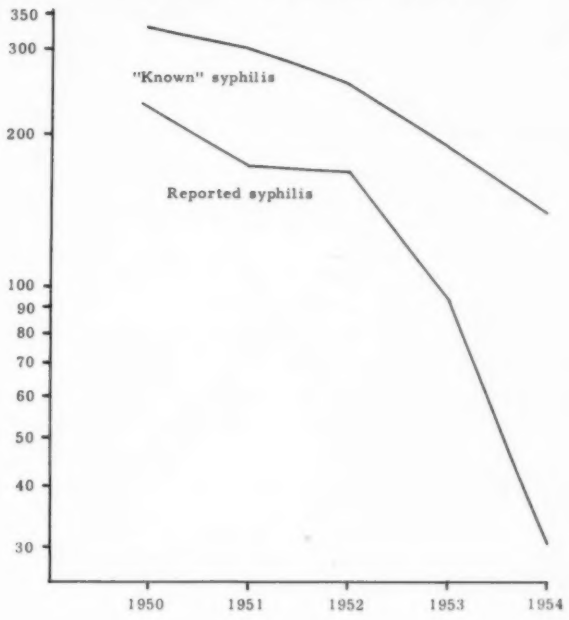


Table 5. Distribution of diagnosed and probable cases of syphilis, January 1, 1950–April 30, 1954

Year	Total number diagnosed and probable cases	Known cases: Percentage of total cases			Probable cases: Percentage of total cases		
		Group A (cases reported)	Group B (cases not reported)	Both	Group C (2 or more examinations)	Group D (single examination)	Both
1950	826	27. 6	11. 5	39. 1	15. 7	45. 2	60. 9
1951	660	26. 1	19. 2	45. 3	17. 4	37. 3	54. 7
1952	568	29. 4	15. 0	44. 4	15. 3	40. 3	55. 6
1953	560	16. 6	17. 3	33. 9	23. 2	42. 9	66. 1
1954 [1]	188	5. 9	19. 1	25. 0	32. 4	42. 6	75. 0
1950–54	2, 802	23. 9	15. 7	39. 6	18. 7	41. 7	60. 4

[1] 4 months, January–April 1954.

NOTE: For full definitions of groupings, see text, page 197.

the State laboratory is heavily weighted by the legally required premarital and prenatal tests. This epidemiologically important group will therefore comprise the most significant portion of those persons having a single test.

Some individuals who, according to the State's record, have had a single positive STS may have a previous history of syphilis infection and will have been placed under treatment. However, those in this group who fail to remain under medical observation for sufficient time for a definite diagnosis to be made should, for their own protection and for the protection of the public, be returned to medical observation until a definitive diagnosis is established.

It is apparent that there is need not only to improve morbidity reporting in Montana but also to insure the followup and diagnosis of individuals known to have a positive serologic reaction to syphilis.

Postanalysis Activity

Upon completion of the analysis of the central registry data, plans were made, as far as limited staff and budget would permit, to utilize the information:

1. To encourage more complete day-to-day reporting.
2. To increase physicians' index of suspicion of syphilis.
3. To promote better followup of suspects.
4. To provide additional data to determine the validity of the assumptions derived from the analysis of the central office statistics and to amend the State syphilis morbidity records for each of the study years (1950–54).

These objectives were to be accomplished by staff interviews with all physicians, including medical directors of hospitals and institutions, who had submitted positive serologic specimens:

1. To procure a morbidity report attributable to the year of diagnosis for all unreported cases of syphilis.
2. To determine the number of negative cases in the study group.
3. To learn the disposition made of unresolved cases.
4. To provide a list of suspects for future followup.

The names of persons in groups B, C, and D (table 3) were listed by city of residence, each list being subdivided into those under observation for the last time in 1950–52 and those observed in 1953 or later. Information entered on the list from the central registry cards included name, date last seen, total number of serologic specimens examined, result of latest test, and group classification. Space was provided on the forms for information gained from the interviewer's visit to the physician, including diagnosis, date of diagnosis, or other disposition if no diagnosis had been made.

Responsibility for securing the information in the field was placed with the directors of the local health districts for those cases residing within their jurisdictions. Responsibility for obtaining information from State institutions, the medical services of the Indian reservations, Veterans Administration, the hospitals, and

Figure 3. Syphilis morbidity reporting in Montana, 1950–54.

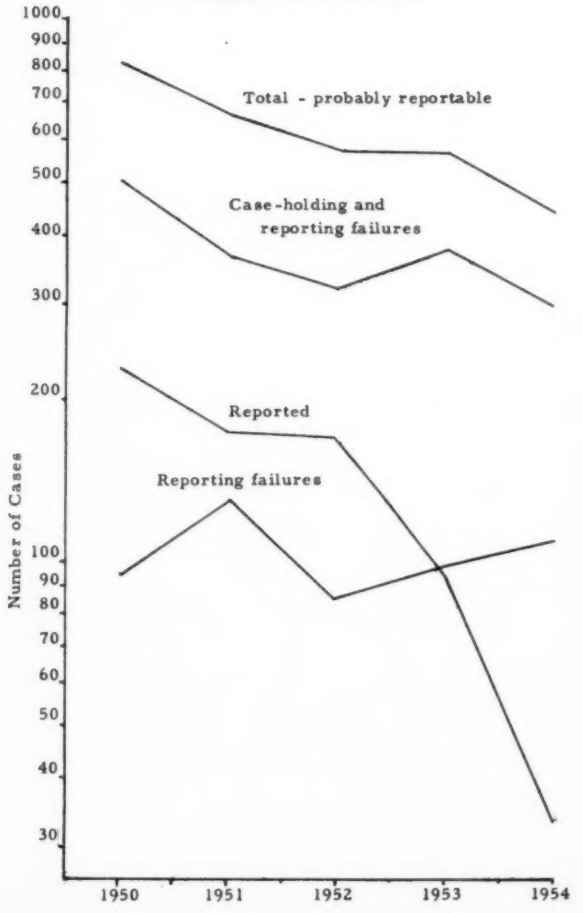
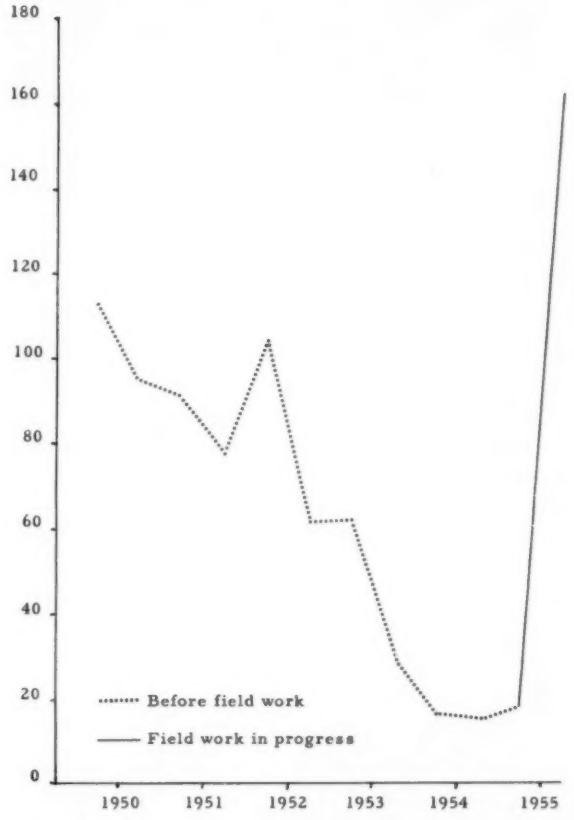


Figure 4. Number of reported syphilis cases in Montana before and after field study, 1950–55.



physicians and hospitals in unorganized counties was delegated to a records adviser loaned to the State board of health by the Public Health Service.

Prior to the visit of State or local personnel to any area, letters from the State or local health officer were sent to all physicians to be interviewed, outlining the nature of the study and information which would be requested.

The field phases of the study began in August 1955 and, because of the vast size of the State and the limited time both State and local personnel have to devote to this work, field investigations are still continuing. By the first of January 1956, all State institutions, three of the five Indian reservations, and approximately three-fourths of the physicians and hospitals had been visited. While detailed reports on the disposition of the cases on which information was gained will not be available until the completion of the field work, the field visits and central office activities have already had a dramatic effect upon reporting of current cases of syphilis.

For the first 6 months of 1955, the number of cases reported week by week was close to the number reported in 1954. Immediately after instituting the procedure of mailing confidential report forms with all positive laboratory reports, and following the visit of the records adviser to the first area, the number of reports of current cases of syphilis began to increase (fig. 4). By the last of October, the 43d reporting week of the year, the number of cases reported was five times that for the same period in 1954. By the end of 1955, 179 cases had been reported as compared with 31 cases in 1954, a ratio of about 6 : 1. The geographic distribution of reported cases indicates that, while there was a statewide increase in reporting, beginning with the inclusion of morbidity report cards with serologic reports, the greatest reporting gains were made in those areas visited by the records adviser.

In addition to achieving more complete reporting for syphilis, there has been a gain in the number of cases of gonorrhea and other communicable diseases reported.

Preliminary tabulations of data for 1955 would seem to substantiate the conclusions drawn from the central registry study that the major influence in the decline in number of syphilis cases reported was the result of underreporting rather than of an absolute drop in current infections.

Summary

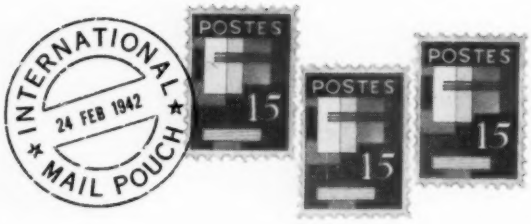
The number of syphilis cases reported annually in Montana has declined much more rapidly than would seem to be justified by the number of known reactors to serologic tests for syphilis.

The decline in the number of cases of syphilis reported from all sources more nearly parallels the trend in expenditures for venereal disease control by local and State health departments than it does the probable rate of infection as determined by a study of the State's central registry of reports of cases of syphilis.

During the period January 1950–April 30, 1954, 3,521 individuals with positive serologic

tests for syphilis were under treatment or observation. Of these, 2,802 probably had syphilis. Of this "probable" group, only 23.9 percent were so reported by physicians, clinics, and institutions while 15.7 percent were known to have been treated for syphilis but were not reported as cases. An additional 18.7 percent had had two or more positive serologic tests for syphilis. The largest group of reactors (41.7 percent) with unknown diagnostic status had had a single test.

Field work and central office efforts by the State board of health to determine the diagnostic status of reactors, although only partially completed, have already resulted in a sixfold increase in reporting of current cases.



Bricks for Peru's Houses

Encouraged by the Peruvian Government's interest in housing, we have met with housing and planning officials of the newly formed Housing and Land Reform Commission and with representatives of the Inter-American Housing Center of the Pan American Union. We have been working with a local engineer on producing and marketing "sand-lime" brick in the Lima area. The project has been negotiated, and the plant, financed by Peruvian capital, is under construction.

—ELOY A. BARREDA, *sanitary engineer, United States Operations Mission, Peru.*

Water, But None to Drink

Sudden, heavy rains, over a large part of Iran, especially on the vast plains where the central desert approaches the Zarqan Mountain, badly damaged roads and other communication facilities. After road repairs permitted us to reach remote localities, we learned that the worst health problems had developed in the flat regions, some distance from the mountain, where flood waters had completely destroyed the villages.

Water was the most urgent need. The villagers have no natural water supply but depend on *ghanats*, underground water canals laboriously and hazardously constructed by hand, sometimes extending for many kilometers and often reaching several hundred feet in depth. The floods had filled the *ghanats* with dirt or otherwise ruined them. Water for the villages had to be carried over long distances by man and beast.

The public health department, in the emergency, dispatched 13 teams supplied with perchloron, drugs, and typhoid vaccine.

—GLEN W. MCDONALD, M.D., M.P.H., *chief, Public Health Division, United States Operations Mission, Iran.*

Hospital Lottery in Iraq

In Iraq, the Mutsariff of Basrah Liwa, who recently contributed 300 dinars ($840) toward the building of two subhealth centers, has requested a food-handlers course. Lottery funds will finance the construction of the 130–140 bed maternity hospital in Baghdad. Health films shown in the evening, twice a week, on Baghdad street corners are attracting crowds of people. The health exhibit at the agricultural fair in Sulaimaniyah was highly original: It included two mud dwellings in miniature, one sanitary and the other insanitary.

—JOHN LEWIS, M.D., *chief, Health and Sanitation Division, United States Operations Mission, Iraq.*

Experimental Ground Water Pollution at Anchorage, Alaska

By H. J. FOURNELLE, Ph.D., E. K. DAY, M.S., and W. B. PAGE, M.S.

UNDERGROUND WATER pollution is of prime importance to public health officials concerned with safeguarding the potability of water supplies.

A study by Stiles and associates (*1*) has been considered a classic in this field. An extensive inquiry into ground water pollution from experimental latrines was made by Caldwell and Parr (*2*). And more recently the sanitary engineering research laboratory of the University of California (*3, 4*) has investigated several aspects relating to the conservation of ground water by the reclamation of sewage effluents through direct recharge into the ground water.

In studying the lateral movement of simulated bacterial and chemical pollutants through ground water in an Alaskan area, our first task was to find suitable indicators which would persist during a winter in a subarctic climate. These indicators were to be traced at least 1 year to determine the limits of duration or survival.

The experimental site was a small plot of land about 2 miles south of Anchorage. The ground water table was shallow, with the top between 5 and 6 feet below the surface of the ground. Mechanical analysis of the soil at the ground water level indicated it had a sandy-gravel texture, representative of a considerable portion of the Greater Anchorage area (*5*).

The test agents, the dye uranin and bacteria, were introduced directly into the ground water.

The two bacterial types most commonly used for ground water pollution studies are coliform organisms and *Serratia marcescens*. But since some coliform organisms had been found sporadically in the soil of the test site, using these organisms as indicators, we felt, would cause confusion. We therefore tried, in separate tests, three chromogens in combination and an enterococcus.

In addition to the dye and bacterial tests were cultural and biochemical studies of organisms taken from the sampling wells and the dialysis of test organisms suspended in the ground water.

Tests With Dye

The dye of choice for ground water pollution studies is uranin, the sodium salt of fluorescein.

A dosing well was dug, and a galvanized pipe 10 inches in diameter was sunk into the ground water. A ring of 9 sampling wells was placed around the dosing well at a distance of approximately 3 feet. Eight- to ten-foot lengths of ½-inch pipe, with 12-inch wellpoints on one end and T-connections threaded onto the other, were sunk as sampling wells. The T-connections had solid metal plugs on top to facilitate pounding

Dr. Fournelle is a bacteriologist with the Epidemiology Section of the Arctic Health Research Center, Public Health Service, Anchorage, Alaska. Mr. Day was formerly chief of the Environmental Sanitation Section of the center, and Mr. Page is the present chief. Mr. Day is now with the General Engineering Program, Division of Sanitary Engineering Services, Public Health Service, Washington, D. C.

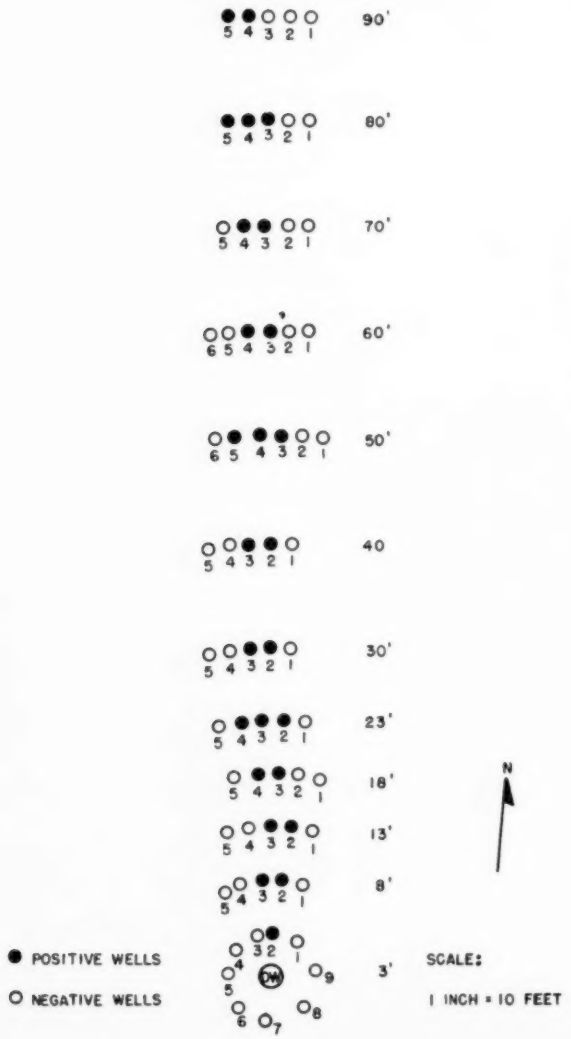
Mrs. Clarissa Allen and Mrs. Dorothea Swan gave technical laboratory assistance during several phases of the work.

the pipe into the ground and ¾-inch openings on the side for connecting a suction sampling device.

The well was dosed once with 1 liter of a 10 percent concentration of uranin to determine how long this specific amount of the dye could be detected. The method of dye concentration for ultraviolet light examination recommended by the bureau of environmental sanitation of the New York State Health Department (*6*) was used.

On the second day after dosing, well No. 2 in the ring (fig. 1) became positive. Five or six sampling wells were then placed in arcs at 5- to 10-foot intervals in the direction of dye movement as wells became positive for the dye.

Figure 1. Original dye pattern, October and November 1951.



There appeared to be a relatively narrow channel of dye flow, between 1½ and 4 feet wide, with well-defined negative borders. This channel was apparent for approximately 2 to 5 weeks. The rate of movement of the dye through the ground water was about 2 feet per day.

Additional positive wells, west of the original direction of flow, were found 65 days after the original dosing. This indicates a primary and a secondary flow pattern. About 9 months after the dosing, a further shift of the dye westward was found in some of the wells. Three wells on the right border of the dye pattern had become negative.

About 2 years after the original dosing, the pattern of flow was wedge-shaped, extending from the apex at the dosing well in a northwest direction to about 40 feet in width 90 feet away. The outline of the wedge was marked by negative wells. Two years and ten months after the original dosing, dye was still evident in 38 of 48 wells examined. The dye pattern indicating all wells that were positive is shown in figure 2.

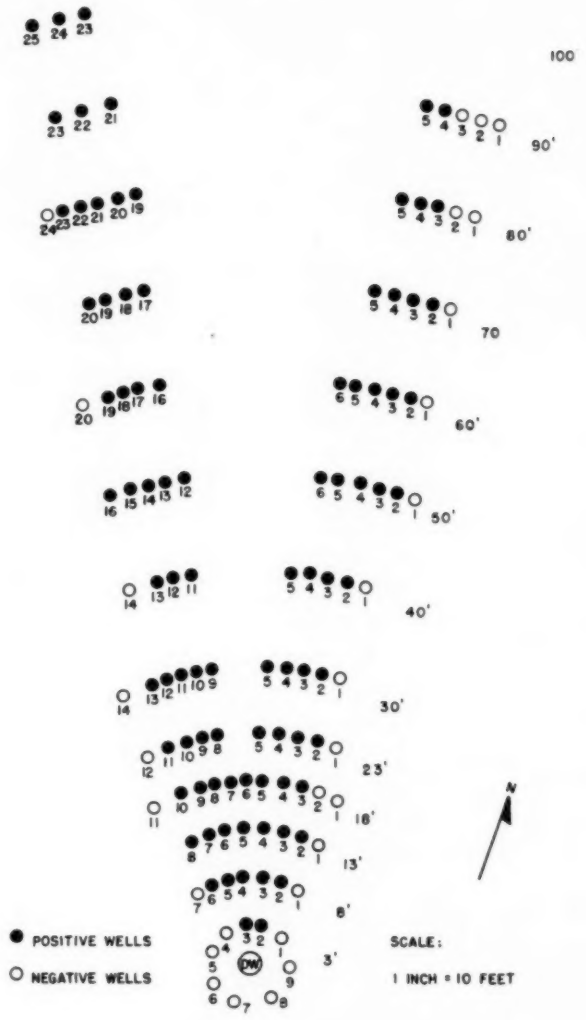
Tests With Chromogenic Bacteria

Prior to initiating the bacteriological field work, samples of the soil and ground water were examined in the laboratory for bacterial chromogens, and the effects of varying concentrations of uranin on the test organisms were compared. The first study showed that chromogens were present sporadically and in small numbers. We believed, therefore, that a group of selected bacterial chromogens together would be feasible as tracer organisms. In the second study, we found that uranin had no apparent inhibitory effect on the test organisms in concentrations that might be expected in the ground water.

The organisms used were *Serratia marcescens* (ATCC 6889), *Chromobacterium violaceum* (ATCC 553), and two strains of *Bacillus globigii* (ATCC 9372 and FDM). Cultures were obtained from the American Type Culture Collection, Washington, D. C., and the United States Army Biological Department at Fort Detrick, Md.

The dosing schedule for the bacterial chromogens was begun at the same time as the dye dosing. Nineteen 1-liter doses of 24- to 48-hour

Figure 2. Total dye pattern, October 1951 to August 1954.



nutrient broth cultures of each of the 4 chromogens were placed in the ground water over a period of 35 days.

The water was examined for 9 weeks. It was not possible to trace the movement of these organisms. Bacteriologically, there did not appear to be any noticeable difference from the predosing examinations. A complicating factor appeared to be the large numbers of natural soil bacteria found consistently in the ground water.

It was apparent at this point that we needed some definite criteria for the selection of test organisms. These criteria were: (*a*) the test organism should have some specific and permanent distinguishable property, cultural or biochemical, or both; (*b*) a laboratory test to distinguish this organism from soil bacteria should be available; and (*c*) the test organism should be capable of extended survival in the ground water.

Test With an Enterococcus

Certain enterococci appeared to meet the above requirements. Accordingly, a beta hemolytic, gelatin-liquefying strain, *Streptococcus zymogenes* (ATCC 4533), was obtained. (Although the culture is listed as *Streptococcus liquefaciens* in the ATCC catalog, it is designated here as *S. zymogenes* because it was beta hemolytic.) For the cultural and biochemical properties of the test organisms employed in this study, see Bergey's Manual (*7*).

Prior to the use of this organism, 78 samples taken from the dosing well and from 26 of the experimental test wells were examined for enterococci. Four samples were positive for nonhemolytic enterococci only.

Ten liters of 48-hour nutrient broth cultures of 2 strains of the enterococcus test organism were introduced into the ground water over a period of 11 days. A limited number of test organisms were used to see how far such a number could travel and how long they could survive.

Either 1-liter or 1-gallon samples were taken over a period of 371 days. Bacterial population was estimated by planting serial quantities of 100 ml. and less, in tenfold dilution steps, into sodium azide glucose broth (*8*). The remaining portion of the liter or gallon was filtered through a membrane filter (*9*), and the filter pad was placed in the azide glucose medium. After incubation at 45° C., positive results, as indicated by growth in the liquid medium, were confirmed by streaking a loopful of the material onto blood agar plates. The need for confirmation was pointed out by Ostrolenk and Hunter (*10*), who showed that false positive as well as false negative reactions occur in this medium. Microscopic examinations were made of gram-stained smears taken from the blood agar plates. Representative cultures were picked for cultural and biochemical studies.

On the third day following the initial dosing,

Figure 3. Path of test organisms, August 1953 to August 1954.

the test organism was found in the 3-foot ring of wells, and on the seventh day, in the 8-foot arc. Although this indicated a rate of movement of about 1 foot a day, it held only at those two points. The rate of flow of the test organism was irregular, averaging about 0.48 foot per day. The organism was traced to a distance of 50 feet where it was detected on the 70th day after dosing.

The test organism described a definite path of flow with sharp and clear-cut boundaries (fig. 3). The width of the path ranged between 1½ and 4 feet.

Although the organism followed a definite path, its direction did not coincide with the path of the initial dye flow observed 2 years earlier since there had been a 26° change in the direction of the primary flow of the ground water. The path of the organism was still within the limits of the large wedge-shaped pattern formed by the dispersion of the dye. The reason for the change in direction of the ground water is not definitely known. However, there had been considerable housing construction in the area since the original dosing of the well with the dye, and the increased use of water from shallow wells may have contributed to the change in direction.

Large samples must be taken to show the test organism initially and at final sampling (see table). The bacteria gradually increased to a maximum number in most of the positive wells and then gradually decreased. This was most apparent in the wells nearest the dosing point.

Wells and samples positive for test organism

Wells [1] positive for test organism	Smallest amount of sample, in milliliters, showing test organism [2]		
	Initially	At highest concentration of organism	At final positive sampling
Dosing well		0.000001	10
3–3	1,000	0.0001	FP [3]
3–4	0.01	0.01	1,000
8–5	10	0.00001	100
8–6	1	0.1	FP [3]
13–6	0.1	0.01	10
13–7	1	1	FP [3]
18–9	100	1	1,000
18–10	10	10	FP [3]
23–9	1,000	10	10
23–10	1,000	10	100
23–11	1,000	1,000	1,000
30–11	10	0.01	1,000
30–12	1	1	FP [3]
30–13	1,000	10	FP [3]
40–12	10	1	100
40–13	FP [3]	10	100
50–14	10	1	100

[1] Wells are designated by position in feet and well No.

[2] Larger portions in the tenfold stepwise inoculation scheme were, in most cases, also positive while smaller portions were negative.

[3] 1-liter or 1-gallon sample filtered through sterile filter paper (FP) which was placed in azide glucose medium for incubation. This test gave the only positive result.

As progress was made away from the dosing well, fewer organisms were detected. The tabulation reveals that of the positive wells in each arc, one usually had a higher concentration of the test organism. This concentration ranged from a single tenfold dilution step to 4 tenfold steps.

Ninety-five days after dosing, test organisms were detected in all positive wells except 18–10. The latter became positive during the winter when sampling was incomplete because of frozen pipes and a lowered water table. The first positive sample from this well was taken on March 8, 1954. Regression of test organisms was first noted in May, about 280 days after dosing. After 295 days, the organism was not recovered beyond 30 feet; after 316 days, not beyond 13 feet; and after 327 days, not beyond 8 feet. At the end of the study period (371 days), the only well positive for the test organism was the dosing well. The complete regression is attributed mainly to bacterial die-off and to the effect of dilution. Although Caldwell and Parr (*2*) considered clogging of the filtration bed an important factor in bacterial regression, we do not believe it was a primary factor in this study since a limited amount of culture material was added to the ground water.

Cultural and Biochemical Studies

Further studies were made of 282 enterococcus cultures picked from blood agar plates. On the basis of hemolysis and gelatin liquefaction, these cultures were differentiated as follows:

Number of cultures	*Beta hemolysis*	*Gelatin liquefaction*	*Identity*
201	+	+	*S. zymogenes*
80	−	−	*S. faecalis*
1	−	+	*S. liquefaciens*

Fermentation studies detected acid production in sucrose, mannitol, sorbitol, glycerol, arabinose, and raffinose. The fermentation reactions of the *S. zymogenes* cultures were very constant. Acid was produced in 5 of the 6 sugars, the exception being raffinose. Only 1 of the 201 cultures tested varied by fermenting all 6 sugars.

The fermentation reactions of the *Streptococcus faecalis* cultures were variable and, along with the one *S. liquefaciens* culture, differed from those of the *S. zymogenes* cultures.

Dialyzing Culture Studies

One of the factors affecting the outcome of an experimental pollution study is whether or not the test organism can survive the environmental conditions to which it is exposed. Coincidental with the tracing of the movement of the test organism through the ground water, we studied the rate and extent of die-off of 5 strains of bacteria used in two phases of the experiment. The organisms were *S. marcescens*, 2 strains of *B. globigii*, and 2 strains of *S. zymogenes*.

Nutrient broth cultures of the organisms were placed in separate dialyzing membranous sacs, made from cellophane tubing, which were then suspended in the dosing well. Exposure times varied from 24 hours to 1 year. The semipermeable sacs retained the bacteria while permitting penetration and passage of substances in solution in the ground water into and through the membranous walls, thus simulating closely the conditions encountered by the test organisms in their travel through the ground water.

Although the rate and extent of bacterial die-off were quite pronounced for all five strains, an appreciable number of organisms survived after 1 year's exposure in the ground water. *S. marcescens* was reduced in numbers approximately 92 percent by the end of 28 days, but the surviving organisms were still well pigmented. At the end of 2 months, the decrease in numbers was 98.9 percent with some loss of pigment. After 4 months, there was no apparent further change in count, but there was a complete loss of pigmentation. Along with loss of pigment, biochemical changes, notably, a loss of fermenting powers, were also noted. The two strains of *B. globigii* showed similar losses in numbers and pigment-producing powers at the end of 28 days, and at the end of 4 months these strains were not recognizable.

The *S. zymogenes* cultures showed a progressive decrease in numbers from initial populations of 146 and 158 millions per milliliter for the two strains used to 5,800 and 4,900 per milliliter, respectively, after 1 year. Cultural and biochemical studies of isolated organisms

showed that the surviving organisms retained their original distinctive properties.

Discussion

The present study concerns methodology primarily, with emphasis on the selection of bacterial indicators. The need for such emphasis became apparent because of certain shortcomings of the several types of bacterial indicators first used in the study.

It has been shown that the enterococcus, *S. zymogenes*, is capable of long-time survival in ground water and possesses a high degree of permanency in its characteristic cultural reactions. Although there may be a pronounced reduction in numbers over a year's time, a sizable portion may be expected to survive if the initial or dosing numbers are sufficiently large.

The use of *S. marcescens* as a tracer organism has limitations because the pigmentation is a variable property. The failure of *B. globigii* may have been due to use of a mixture of vegetative cells and spores rather than a pure spore suspension.

In addition to those properties which favor the use of uranin as a chemical agent for tracing the movement of underground water, the dye was shown to have long-lasting properties in the soil and ground water, thereby facilitating prolonged studies of underground water flow. Because of the acid nature of the dye and the prevailing pH values of the ground water, it is believed that the dye could be used concurrently with the bacteria.

If dosing had been continuous, greater dye and bacterial concentrations would very likely have been found in the positive wells with possibly a resulting extension in the flow pattern of each agent.

The vertical depth to which the dye and test organisms penetrated was not determined.

The study has demonstrated that the rate and extent of die-off of bacterial test organisms in the ground water can be determined by dialyzing culture studies. The distance to which bacteria can travel through the soil via ground water is dependent upon the degree of survival of test organisms as well as the mechanical filtering action of the soil itself. The numbers of survivors will depend, in great part, upon the numbers of bacteria introduced into the ground water. The findings of this investigation suggest the inclusion of a dialyzing culture study concurrently with the introduction of the test organism into the soil or ground water.

No doubt there are other suitable bacteria for ground water studies. Other enterococci which should also be suitable are *Streptococcus durans* and *S. liquefaciens*. *S. faecalis* is not recommended because it is considered to be the most common of the enterococci. Through the use of large samples, this organism was isolated many times.

The coliform group as a whole is not considered suitable since it is made up of a number of different species. The property of lactose fermentation by itself is not sufficiently distinctive. Because of the widespread nature of these organisms, the findings of small numbers in ground water could easily be confused with contamination from the surface of the ground. If a member of the coliform group is especially desired as a test organism, there is a possibility that *Escherichia freundii*, a coliform intermediate, might be suitable. The production of hydrogen sulfide distinguishes this organism from the other coliforms.

Some applications of the procedure given in this report are: (*a*) formulation of safe standards for water supplies with respect to location from points of pollution; (*b*) providing a method, where pollution of a water supply is suspected, of determining whether or not it has occurred or is possible; and (*c*) showing the availability of two highly specific simulants, a dye and a bacterium, for detection of other forms of contamination.

Summary

This study has demonstrated a method for tracing the movement of simulated chemical and bacterial pollutants in ground water. A procedure for evaluating the effects of the underground environment on the viability and on the cultural and biochemical properties of bacterial indicators is given. Emphasis is placed on the necessity of selecting as bacterial indicators, test organisms with distinctive and stable characteristics.

Uranin was found to be very satisfactory for determining direction of flow of ground water. The dye was traced 100 feet from the point of dosing and was detected 2 years and 10 months later. The path of the dye varied from an initially narrow channel, 1½ to 4 feet in width, to a wedge-shaped expansion measuring 40 feet at the distal end after several years.

A member of the enterococcus group of bacteria, *Streptococcus zymogenes*, was found to be suitable as an indicator or tracer organism to determine the extent of travel through the ground water. It was possible to trace this organism for 50 feet. The width of the path of travel varied between 1½ and 4 feet.

The several bacterial chromogens used were not found suitable as test agents in this study.

The dialyzing culture study was found to be a necessary adjunct in determining the degree of survival of the test organisms in the ground water.

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McGuinness Appointed Special Assistant

Dr. Aims Chamberlain McGuinness has been appointed by President Eisenhower as the new Special Assistant for Health and Medical Affairs to the Secretary of Health, Education, and Welfare. Dr. McGuinness replaces Dr. Lowell T. Coggeshall, who resigned to resume his post as dean of the division of biological sciences at the University of Chicago.

Prior to his appointment, Dr. McGuinness practiced medicine in the field of pediatrics in Philadelphia. He has been a faculty member at the University of Pennsylvania School of Medicine since 1934.

In the period 1948–51, Dr. McGuinness was director of the Children's Hospital in Philadelphia. He served as dean of the University of Pennsylvania Graduate School of Medicine from 1951 to 1954, and subsequently as clinical director of the Miners Memorial Hospital Association of the United Mine Workers Welfare and Retirement Fund. In this capacity, he was instrumental in constructing and staffing hospitals in the mining areas of Kentucky.

During World War II, he served as assistant administrator for the Army Epidemiological Board, and was awarded the Legion of Merit.

Zoonoses in the South

By J. D. MARTIN, M.D., M.P.H.

THE World Health Organization lists 87 diseases of lower animals transmissible to man (*1*). Of these, 49 occur in the southern United States (see table). As man's knowledge increases, still other zoonoses will probably be recognized, classified, and studied. The epidemiological concept of animal-to-man transmission is already broadening to include the concept of man to animal to man transmissibility of disease. The zoonoses, therefore, are of importance in human health and disease, and we need to know more concerning them.

Early Knowledge

Man's knowledge of some of the zoonoses dates back to antiquity, and control measures antedate recognition of the infectious nature of these diseases by hundreds of years. Although the exact cause of bacterial, rickettsial, and viral infections remained unknown to the ancients, they nevertheless developed a remarkable amount of useful information, including accurate descriptions of clinical entities and much detailed epidemiological information.

A pestilence associated with the presence of multitudes of "mice," probably bubonic plague, is mentioned in the Bible. Another disease, which could have been anthrax, is recorded in the Bible as destroying all the beasts—horses, asses, oxen, camels, and sheep—in the time of Moses.

Rabies was one of the first recognized diseases. Kelser (*2*) says, "Plutarch asserted that, according to Athenodorus, it was observed in mankind in the days of the Aesculapaidae, the descendants of Aesculapius, the god of medicine. Kelser also quotes Aristotle in the fourth century B. C. as writing that "dogs suffer from madness which puts them in a state of fury, and all animals which they bite when in this condition become also attacked with madness."

Tsutsugamushi fever, or mite typhus, is believed by Williams (*3*) to have been recognized as an entity since the 6th century A. D. Blake and co-workers (*4*) believe that it afflicted the natives of south China in the 16th century.

Epidemics of louseborne typhus probably occurred in any civilization whenever people lived under crowded, insanitary conditions. "In 1083 an epidemic occurred in Italy which, probably, was typhus. A few years later in 1106, another epidemic, apparently of the same disease, occurred in Bohemia. In both of these epidemics the outbreak followed famine" (*5*).

Current Status

In recent years much has been accomplished in the prevention and control of respiratory and enteric diseases. It is now time to strengthen, through adequate maintenance and surveillance programs, the gains that have been made against these diseases. It is time also to attack forcefully the zoonoses because of their increasing importance to health and economy.

During the period 1944–55, seven zoonoses—brucellosis, rabies, ringworm, salmonellosis, staphylococcosis, streptococcicosis, and tuberculosis were reported in all of the southern States and the District of Columbia. In the District of Columbia, however, human rabies (2 cases)

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was last reported in 1944 and dog rabies (1 case) in 1950. Psittacosis was reported in all of these States but Missouri. Leishmaniasis was reported only in Florida and trypanosomiasis, only in Texas.

Holle states that the first two cases of American trypanosomiasis in this country were reported from Texas in 1955 (*6*). The etiological agent *Trypanosoma cruzi* was demonstrated in the cerebrospinal fluid of the second reported case. Six species of *Triatoma* in Texas have been found to be naturally infected with *cruzi*.

Forty-five of the forty-nine zoonoses known to occur in the south have been reported in Texas, according to a personal communication from the State epidemiologist and the Livestock Sanitary Commission. When the survey questionnaires were returned, rickettsialpox, leishmaniasis, glanders, and ratbite fever were not reported as occurring in Texas. However, Griffith and McNaughton (*7*) published a report of the occurrence of ratbite fever in Texas. Therefore, 46 of the 49 zoonoses actually occurred in Texas.

Foot-and-mouth disease has not occurred in the United States since 1928. Both Louisiana and Texas have recently been exposed to the threat of this disease, however, by the importation of a herd of Charolais cattle smuggled from Mexico into Louisiana through Texas. This stresses the need for constant surveillance against the importation of exotic diseases.

Q fever has been reported in Mississippi, North Carolina, Texas, Louisiana, and Virginia; rickettsialpox in Maryland, Mississippi, and Virginia.

Many wild animals are infected with, or are carriers of, infectious agents capable of causing disease in man. Fortunately, man's contact with these animals is so infrequent, or so casual, that it is only occasionally that human infections occur. It is good that this is so because many of the diseases of the lower animals are fatal to man.

Plague

Sylvatic plague occurs in at least 38 species of rodents in 14 States (*8*). Important species are: ground squirrels, wood rats, white-tailed prairie dogs, chipmunks, and marmots. The disease is present among the rodents in the States on the plains east of the Rocky Mountains as well as in the States west of the Great Divide. The importance of sylvatic plague as a reservoir of human disease needs continuous investigation.

Murine plague is not an important disease in the United States at this time. The risk of infection spreading through ports and coastal cities must not be overlooked, however. A ship's docking and permitting infected rats to escape to the mainland is prevented only through constant vigilance and control.

Bubonic plague is the most common type of this infection in man—giving rise to about 75 percent of reported cases. The case fatality rate ranges from 50 to 90 percent. Epidemics in man always include a small number of cases of septicemia and secondary plague pneumonia. By aerogenic transfer these cases give rise to other cases of pneumonic plague. Pneumonic infections usually end in death. Seventeen human cases of plague have been reported in the United States since 1925 (*8*). Fortunately, the vectors of this disease have not had cause, except occasionally, to desert their rodent hosts for man. We must be constantly alert to the possibility of this occurrence, however.

Tularemia

Tularemia, a disease caused by a bacterium closely related to the bacillus which causes plague, has been reported in all the southern States except Alabama and Missouri. East of the Mississippi the common belief is that most cases in humans are contracted from the handling of infected rabbits. Of late, more cases associated with insect bites, particularly tick bites, have been found. Natural infection occurs in sheep and deer as well as in rodents such as ground squirrels, hares, and rabbits, and in certain wild birds, particularly quail and grouse.

Yellow Fever

Yellow fever, which ravaged Louisiana almost annually from its colonization until 1905, has not been reported in the southern States since that time. This pestilential disease is one that must be kept under constant surveillance, however, and mechanisms to prevent its

entering this country need to be perfected and maintained. Jungle yellow fever is gradually moving northward from South America. It has progressed from the jungles of northern South America through Central America into northern Honduras.

In 1907, Carroll (*9*) estimated that yellow fever had caused 100,000 deaths in the United

Zoonoses reported in the southern United States, by State, 1944–55 [1]

Disease or vector	Alabama	Arkansas	District of Columbia	Florida	Georgia	Kentucky	Louisiana	Maryland	Mississippi	Missouri	North Carolina	Oklahoma	South Carolina	Tennessee	Texas	Virginia	West Virginia	Total
Amebic dysentery	x	x	x	x	x	x	x	x	x	---	x	x	x	x	x	x	x	16
Anthrax	x	x	---	x	x	x	x	x	x	x	x	x	x	x	x	x	---	15
Arthropod-borne virus:																		
St. Louis encephalitis	---	x	---	---	---	---	---	---	---	x	---	x	---	x	x	x	---	6
Eastern equine encephalomyelitis	x	x	---	x	x	x	x	x	x	x	x	x	x	x	x	x	---	15
Western equine encephalomyelitis	x	x	---	x	---	x	x	---	x	x	---	x	---	x	x	x	---	11
Louping-ill infections	---	---	---	---	---	---	---	---	---	---	---	---	---	---	x	---	---	1
Aujesky's disease	---	x	---	x	x	---	x	---	x	x	x	x	---	x	x	x	---	11
Balantidiosis	---	---	---	x	x	---	x	x	---	x	---	---	---	---	x	---	---	6
Brucellosis	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	17
Bug bites	---	x	---	x	x	---	x	---	---	x	x	---	x	---	x	x	x	10
Cestode diseases	---	x	---	x	x	---	x	---	---	x	x	x	x	---	x	x	---	10
Chicken-mite itch	---	x	---	x	x	---	x	x	x	---	---	---	x	---	x	x	x	10
Cowpox	x	x	---	x	x	x	x	x	x	x	x	x	x	x	x	x	x	16
Diphtheria	x	x	x	---	x	x	x	x	x	---	x	x	x	x	x	x	x	15
Endemic (murine) typhus	x	---	x	---	x	x	x	x	x	---	x	x	x	x	x	x	x	14
Epizootic lymphangitis	---	---	---	---	---	---	---	---	---	---	---	---	---	---	x	---	---	1
Equine infectious anemia	---	x	---	x	x	---	x	x	x	---	---	---	---	x	x	x	---	9
Erysipeloid	---	---	x	x	x	---	x	---	x	x	x	---	---	x	x	x	x	11
Flea bites	x	x	---	x	x	---	x	---	x	x	x	---	x	---	x	x	x	12
Glanders	---	---	x	---	---	---	---	---	---	---	---	---	---	x	---	---	x	3
Leishmaniasis	---	---	---	x	---	---	---	---	---	---	---	---	---	---	---	---	---	1
Leptospirosis	x	x	---	x	x	x	x	x	x	x	x	x	x	x	x	x	x	16
Listeriasis	x	x	---	---	x	---	x	x	x	---	---	---	---	---	x	x	x	9
Lymphocytic choriomeningitis	---	---	x	---	---	---	x	x	x	---	x	x	x	x	x	x	x	11
Myiasis	---	x	---	x	x	---	x	---	---	---	x	x	x	---	x	x	---	9
Nematode diseases	---	x	---	x	x	---	x	---	---	x	x	x	x	---	x	x	---	10
Newcastle disease	x	x	---	x	x	x	x	x	x	x	x	x	x	x	x	x	x	16
Ovine pustular dermatitis	---	---	---	---	---	---	x	x	---	x	---	---	---	---	x	x	x	6
Pasteurellosis	---	x	---	x	x	---	x	x	x	x	x	x	x	x	x	x	x	14
Pseudotuberculosis	x	---	---	x	x	x	x	x	---	x	---	---	---	x	x	x	---	10
Psittacosis (ornithosis)	x	x	x	x	x	x	x	x	x	---	x	x	x	x	x	x	x	16
Q fever	---	---	---	---	---	---	x	---	x	---	x	---	---	---	x	x	---	5
Rabies	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	17
Ratbite fever	x	---	---	---	---	x	x	x	x	---	x	x	---	x	---	x	---	9
Relapsing fever	---	---	---	---	---	---	---	---	---	---	---	---	---	---	x	x	---	2
Rickettsialpox	---	---	---	---	---	---	---	x	x	---	---	---	---	---	---	x	---	3
Ringworm	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	17
Rocky Mountain spotted fever	x	---	x	---	x	x	x	x	x	---	x	x	x	x	x	x	x	14
Salmonellosis	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	17
Shigellosis	x	x	x	x	x	x	x	x	x	---	x	x	x	x	x	x	---	15
Staphylococcosis	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	17
Streptococcicosis	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	17
"Tongue worm"	---	---	---	---	---	---	---	---	---	---	x	---	---	---	x	---	---	2
Trematode diseases	---	x	---	x	x	---	x	---	---	x	x	x	x	---	x	x	---	10
Trypanosomiasis	---	---	---	---	---	---	---	---	---	---	---	---	---	---	x	---	---	1
Tuberculosis	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	17
Tularemia	---	x	x	x	x	x	x	x	x	---	x	x	x	x	x	x	x	15
Vesicular stomatitis	x	x	---	x	x	x	x	---	---	x	x	x	---	x	x	x	x	13
Vibrio abortion	x	x	---	---	x	x	x	x	x	x	x	x	x	x	x	x	x	15

[1] Information obtained by questionnaire sent to State departments of health and agriculture.

States since 1793. Of this number, 40,000 occurred in Louisiana where, in 1905, in the final epidemic, 900 of the 8,000 persons who developed the disease died. Yellow fever is endemic in the jungles of South and Central America, especially in the rain forests. It is also endemic in Africa (*10*) from the West Coast, south of the Sahara desert, through the Belgian Congo into Northern Rhodesia, Nyasaland, Uganda, Kenya, and Eritrea. The threat to America is principally through air transportation of infected individuals from endemic areas of the world into the gulf coastal United States, which has been classified as a "yellow fever receptive area" because of the large numbers of *Aedes aegypti* in this area.

South American jungle yellow fever is essentially a disease of jungle animals, especially of monkeys and marsupials. For the most part, the disease in humans is accidental, occurring when humans invade the forests. African jungle yellow fever is primarily a disease of monkeys with several species of *Aedes*, especially *Aedes africanus* and *Aedes simpsoni*, the principal vectors. Should yellow fever become established in urban areas with a high *Aedes* index, such as exists in the gulf coastal area of the United States, an epidemic could result. Only constant vigilance and control of *Aedes* can prevent this occurrence.

Typhus

Murine typhus has been fairly common in the ports and towns bordering the coast. Until the advent of widespread ectoparasite and rat eradication programs, this disease had been spreading to the cities and towns of the interior of the States bordering the coast. Studies are needed on the prevalence of this disease in rat populations. Ectoparasite and rat eradication programs should be continued.

Leptospirosis

Leptospirosis is primarily a disease of rats, dogs, sheep, goats, cattle, and swine. For many years, it has been known as an occupational disease; today it is recognized as a recreational disease as well. Most cases in humans occur in persons subjected to immersion or wetting with water containing the *Spirochaeta* or working with, or around, infected animals. Studies of rats in Nashville (*11*) in 1917; in Washington, D. C. (*12*) prior to 1918, and in Baltimore (*13*) in 1924 revealed, respectively, 10, 7, and 10 percent of the rats of these cities to be infected with *Leptospira icterohaemorrhagiae*. *Leptospira pomona* infection of dairy cattle and *Leptospira canicola* infection of dogs have been demonstrated in widespread areas throughout the United States.

Arthropod-Borne Virus Diseases

Four arthropod-borne virus encephalitides occur in southern States. These are caused by closely related viruses, have birds as their natural reservoirs, and are usually spread by the bite of mosquitoes and ticks. They are eastern and western equine encephalomyelitis, St. Louis encephalitis, and louping ill or encephalomyelitis of sheep. The eastern type of equine encephalomyelitis is confined largely to the east coast of the United States from Louisiana and Florida to Massachusetts. The western type has been reported in nine southern States—Alabama, Arkansas, Florida, Louisiana, Mississippi, Missouri, Oklahoma, Tennessee, and Texas. Equine encephalomyelitis is the most important infectious disease of horses occurring in the United States at the present time.

Psittacosis

Psittacosis is annually becoming of greater importance. With increasing frequency, humans are being exposed to infection in pet psittacine birds. The disease, known as ornithosis in chickens and pigeons, will probably be diagnosed more frequently in humans as physicians become more conscious of its occurrence and diagnostic tests become more readily available. Occupational disease, resulting from employment in poultry-processing plants, particularly for turkeys, is being more often recognized. Infection may follow either fleeting or prolonged exposure.

Salmonellosis

Infected animals and birds are important sources of the increasing number of *Salmonella* infections reported in humans. There are probably hundreds of unreported and uninvestigated outbreaks of salmonellosis in the southern States each year. Rarely fatal, the

disease causes sufficient disability to account for considerable absenteeism. Over 200 salmonellae have been identified. As our knowledge of these organisms has developed, an increasing number have been found to be pathogenic to man. Poultry, swine, cattle, sheep, rodents, dogs, and other animals have been found to harbor salmonellae capable of producing disease in man.

Rabies

It is a disgrace that rabies, almost a completely preventable disease in domestic animals, is still a threat to humans. From 1946 through 1953, 42,144 cases of animal rabies were reported in the southern States (*14*). Of the 14 human deaths due to rabies in the United States in 1953, 13 occurred in the southern States. In the past half century more human rabies deaths have occurred in the southern States than in all of the rest of the States combined.

Bovine Mastitis

Mastitis is a major disease problem in cattle. Because of the resultant drop in milk production subsequent to the disease, it is, economically, probably the most important disease of dairy cattle. Many organisms are capable of causing bovine mastitis but streptococci and staphylococci are the most important. Usually when one animal in a herd is infected the whole herd is soon involved. To be controlled, therefore, mastitis must be attacked as a herd problem.

Brucellosis

Another major zoonosis affecting cattle and swine which places humans at risk, as well as being extremely costly, is brucellosis. Animals, apparently healthy, will show positive blood agglutination reactions during life, and at death brucellae can be isolated from the tissues of these seemingly healthy animals. Brucellosis is one of the most serious diseases with which the animal industry has to deal. Since the widespread pasteurization of milk for human consumption, brucellosis in humans is largely an occupational disease of farm people, veterinarians, and meat handlers. The economic loss resulting from its ravages runs into millions of dollars annually.

Although human brucellosis is reported each year by State health officers to the National Office of Vital Statistics, the number of reported cases is small in comparison with the number of cases that occur in animals. Few epidemiologists, therefore, attach much significance to reported figures when thinking of incidence and prevalence. Possibly a low index of suspicion of the disease by physicians and the crude diagnostic tests available for confirmation of clinical impression contribute to the small number of human cases reported.

Anthrax

In the period 1945–1951, anthrax attacked 660 herds in the southern States and caused the death of 8,311 animals. Louisiana lost more than half of this number. Only the District of Columbia and West Virginia did not report the occurrence of anthrax during this period. No disease of livestock causes greater consternation and fear than does anthrax when it makes its appearance. It strikes quickly, spreads rapidly, causes heavy losses, and, too often, is transmitted to man. Anthrax in Louisiana Mississippi, and Texas has been recognized since 1860 or earlier (*15*). In 1953, Arkansas, Florida, Missouri, Oklahoma, Texas, and Virginia accounted for 50 of the 198 laboratory-confirmed outbreaks of anthrax occurring in the United States.

Louisiana has a particularly difficult problem with anthrax. The disease is endemic there, having been reported from 55 of the 64 parishes (counties). The incidence of human anthrax is relatively high also. Heeren (*16*) lists 111 cases as being reported from 1920–45. Since 1945, four cases have been reported.

In June, July, and August 1954, three parishes south of New Orleans—Jefferson, St. Barnard, and Plaquemines—reported a widespread outbreak of anthrax. During this same year, sporadic outbreaks were reported in eight other parishes. About 2,000 animal deaths occurred during this outbreak and 6 human cases were reported. Investigation did not confirm the diagnosis in the reported human cases.

Tuberculosis

Tuberculosis is a major public health problem because of its transmissibility to many species of

animals—a fact which persons dealing with human tuberculosis often fail to consider. Feldman says, "The organism of bovine tuberculosis is capable of infecting swine, dogs, cats, parrots, and canaries as well as human beings; the avian tubercle bacillus, besides being pathogenic for most birds, can produce destructive disease in sheep and swine, while the human type of tubercle bacillus is capable of inducing disease in cattle, swine, dogs, and parrots" (*17*). According to Feldman few, if any, species of animals, warm- or cold-blooded, have an absolute resistance to the disease.

The United States Department of Agriculture has had a tuberculosis eradication program for about 30 years. At the onset of the program, 5 percent of animals tested were found to be infected. During the fiscal year ending June 30, 1954, more than 10 million (10.8 percent) of the Nation's cattle were tested for tuberculosis (*18*). The prevalence of bovine tuberculin reactors is now down to 0.1 percent of the animals tested. Today, with bovine tuberculosis, as with human tuberculosis, mass testing gives a very low yield of cases and is extremely costly.

Louisiana is already placing increasing emphasis on good epidemiological investigation of each active case of human tuberculosis, study of suspect contacts, and the application of mass case-finding techniques on a selective basis. The livestock industry should continue its mass testing until it can develop adequate epidemiological investigation of each known reactor and diseased animal, and, in the meantime, public health agencies should give the problem careful study. There is a need to identify, locate, and destroy all reactor animals. While this is being done, it must be remembered that healthy animals can be infected with tuberculosis by infected humans. The chain man-to-animal-to-man must always be borne in mind when unexplained reactors occur in a well protected, controlled herd.

Prevalence in Humans

Except for anthrax and rabies, I have not included figures on incidence and prevalence in humans of diseases originating in animals largely because I am sure each of you is familiar with the human problem in your own locale, and because there is grave doubt of the significance of the low number of reported cases of some of these diseases in humans in view of the widespread occurrence of these same diseases in animals. The prevalence of these diseases among so many animals with which large numbers of our population are in frequent contact emphasizes the threat to human health.

Economic Cost

The economic impact of the zoonoses is great. I do not know the cost for the southern States as separate from the United States, but the Agricultural Research Service of the United States Department of Agriculture estimates that in the period 1942–51 the average loss on livestock and poultry from diseases, parasites, and insects amounted to $2,688 million per year. The cattle industry is rapidly expanding in the south, particularly in Louisiana, Mississippi, and Georgia. The economy of the southern States is largely agrarian. These facts, when associated with climatic conditions which favor the propagation and spread of parasitic and other diseases of animals, strongly suggest that the southern States are bearing more than their pro rata share of the annual $2,688 million livestock and poultry loss.

Control

Obviously, the zoonoses represent a major public health threat and a serious economic loss to States which can afford neither. It is all very well to talk about the control of brucellosis in humans, for example, through the pasteurization of all milk for human consumption and through the development of laws which would insure safe, wholesome meat. Unfortunately, measures such as these only control and decrease the number of human infections; they do not prevent the disease or eliminate its cost. Our goal should be prevention through attacking and breaking the weak link in the epidemiological chain of infection while continuing to control such diseases as occur before the chain of infection is broken.

To attack this problem properly, mechanics should be developed to assure accurate, early

reporting of the occurrence of all transmissible diseases in humans and in animals; the establishment of adequate preventive and control measures; the development of a realization of the constant threat of communicable diseases; a higher index of suspicion concerning them, and the development and utilization of better diagnostic and investigational tools and methods by practitioners of medicine, both human and veterinary.

To maintain the gains made in communicable disease control in the south, all groups interested in human and animal health and in our southern economy should join together in sharing attitudes, knowledge, information, skills, methods, and plans for preventing recurrence of the great animal plagues of the past, such as rinderpest, foot-and-mouth disease, fowl pest, Texas fever (bovine piroplasmosis), and bovine tuberculosis, and for controlling the threats of today—rabies, psittacosis, ornithosis, brucellosis, anthrax, plague, and arthropod-borne viral and rickettsial diseases—until they too can be prevented.

Summary

The transmission of diseases from animal to man and from man to animal poses a serious threat to our health and welfare. Reasonable protective, preventive, and control measures assuring a continually improving public health status and economy will develop to the extent that veterinarians, livestock owners, research workers, economists, physicians, public health officials and others coordinate their efforts and subordinate their personal desires to the development of programs of prevention and control of the zoonoses.

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An experiment in Boston, Mass., suggests that a venereal disease agency can provide the generalized experience in public health required for graduate nursing students.

A Specialized Agency for Field Instruction in Public Health

By ETHEL M. EASTER, R.N., M.S., and NICHOLAS J. FIUMARA, M.D., M.P.H.

FOR YEARS nursing schools have been confronted with a shortage of facilities that can provide generalized field instruction in public health for their students. Some schools have been forced to abandon the practice of placing their students in field agencies; others, to restrict the number so placed because of quotas imposed by allocation committees. But, despite the shortage, most collegiate schools of nursing require that every student in the general nursing program complete 8 weeks of generalized field instruction in public health to qualify for the bachelor of science degree, whether the student intends to enter clinical nursing or public health nursing.

The most obvious solution to this problem is to increase the number of facilities. Philosophically, this is a sound objective, but, practically, there are many obstacles.

Since the primary function of public health agencies is to serve the public, only within the limits of their personnel and money can they help in the education of undergraduate and graduate nurses. Voluntary agencies usually have less money and fewer personnel than they need for their immediate objectives. In addition, their decreasing caseload, which is a result of more and more patients being treated in outpatient departments instead of at home, makes for less diversity of case material. Official agencies, too, are usually hard pressed for sufficient money and personnel to perform the day-to-day activities prescribed by law.

Thus, it seems that any material increase in educational facilities must await additional funds from a population aroused to the need for such facilities. In the meantime, we must consider other possibilities for alleviating the shortage.

In Boston, Mass., we have explored the use of a specialized agency, the division of venereal diseases of the Massachusetts Department of Public Health, for generalized field instruction in public health for nurses. A specialized agency for generalized public health experience is an apparent contradiction in terms. However, our experiment suggests that a specialized agency can fulfill the requirements set down for generalized field instruction.

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Events Leading to the Experiment

In the fall of 1948, the Boston College School of Nursing had a large number of graduate

students who were planning to teach in schools of nursing after graduation. They had a broad clinical background, but they needed experience in a number of different fields of public health nursing, among them venereal disease control. Accordingly, arrangements were made with the division of venereal diseases in the Massachusetts Department of Public Health for a 1-week observation period.

The nurses were so enthusiastic about this experience that a careful study of their evaluation reports was made, followed by personal interviews. The students recommended that the period of field instruction be extended to allow them to participate actively in the division's program by doing contact interviewing and investigation. They reiterated that the 1-week observation period had been worth while for them both as nurses and as "people." Two of the nurses said that they had begun to see the venereal disease problem in a new light and felt sure that they would be better teachers for their experience.

In accordance with the requests from the students, the field instruction period was extended from 1 week to 2 weeks, and later to 4 weeks. A graduate of the Boston College School of Nursing, who majored in public health nursing, found the instruction comparable to that received in a generalized nursing agency. She recommended that the division of venereal diseases be considered as an agency for generalized public health nursing experience.

In view of the growing enrollment at the Boston College School of Nursing and the increasing difficulty of placement in the Greater Boston area, the school decided to explore the division of venereal diseases as a possible agency for an 8-week field instruction program. In the summer of 1952, Easter, a member of the school staff, worked in the division as a nurse epidemiologist, substituting for various members of the staff while they were on vacation. She was thus able to obtain firsthand information concerning the division's program, the qualifications of the supervisors and field personnel, and the type of experience a nursing student might expect to receive there.

This worker quickly became familiar with the basic pattern of the work of venereal disease nurse epidemiologists. She perceived that these specialized nurses interested themselves not only in the possible presence of venereal disease but also in its impact on the patient and his family, that they were concerned with discovering why patients became sexually promiscuous, why extramarital exposures took place, and kindred matters, and that through skillful inquiry they became familiar with other medical, social, and emotional problems in the family, some of them totally unrelated to the disease itself.

In short, the venereal disease nurse epidemiologists practiced generalized public health nursing, using the specific problem of venereal disease as their mode of approach to the family. This is not surprising when one realizes that the epidemiologist has had generalized public health training and experience before she specializes.

After 2 months' experience, the school staff member was convinced that the division of venereal diseases was a valuable source of experience in generalized public health. But would field instruction received in the division constitute the generalized educational experience required for university academic credit? This question needed careful and exact evaluation. Fortunately, criteria were available for measuring an agency's qualifications. These criteria fall into the following groups.

Qualified personnel: The students must receive field instruction under qualified public health nursing supervision in a public health agency which stresses family health. The field teachers, as well as the supervisors, must be adequately trained and qualified public health nurses.

Student experiences: The students must gain experience in family health teaching in the following areas: prenatal, postnatal, infant, preschool, school, adolescent, and adult health, geriatrics, chronic diseases, and rehabilitation.

Staff education: There must be a continuing and adequate program of staff education for the members of the public health agency.

Qualified Personnel

The division of venereal diseases, as one of the operating divisions of the Massachusetts Department of Public Health, is a State agency. It is charged by law with providing an adequate

program in the prevention and control of venereal diseases. It is also a medical care division in that it provides diagnostic and treatment services for those who have, or suspect they have, a venereal disease and are unable to afford private medical care.

The division has a statewide epidemiological service for the interviewing of patients and the followup of their contacts. Concerned with the field training program are the medical director, two public health nursing supervisors, and seven field instructors who are called nurse epidemiologists.

The director is a graduate of an approved school of medicine and the Harvard School of Public Health. He has had 6 years' experience in generalized public health as a district health officer and has specialized in the venereal diseases since 1947. He is a diplomate of the American Board of Preventive Medicine and Public Health and is a lecturer and staff member of the several medical schools and hospitals in Boston.

The two public health nursing supervisors have their certificates in public health. One has had 1 year of experience and the other 12 years with a visiting nurse association. They have had 14 and 17 years' experience, respectively, in the field of venereal diseases.

The field instructors have also had generalized training and experience before specializing. All of them have a certificate in public health nursing.

Experience in Family Health Teaching

The experience one gains from any teaching situation is a product of the interaction of a number of factors, including what the person brings into the situation from prior training and experience, the formal and informal instruction given by the agency, the facilities available, the supply of case material, the quality and quantity of supervision.

At conferences between the nursing school and division staffs, it was agreed that the minimal educational background and experience of a graduate nurse prior to her field instruction should be completion of all academic requirements of the baccalaureate curriculum for graduate nurses. As soon as the school knows what students are to be sent on field instruction, copies of the students' educational achievement and experience are sent to the director of the division, together with the dates for their assignments.

Every graduate nursing student assigned to the division of venereal diseases receives the following instruction and experience over a period of 8 weeks:

1. Orientation on organization of the department of public health and the division of venereal diseases; the program of the division and how it is implemented; the division's relationship to other agencies. This is conducted by the medical director, the supervising public health nurses, and the senior clerical staff, on the first day of the nurse's assignment to the division and occupies 1 full day.

2. A 6-hour lecture course on the clinical and public health aspects of the venereal diseases. The clinical lectures are given by the medical director, and the public health lectures, by one of the nursing supervisors.

3. Demonstrations by the division director and by clinic physicians of active cases of gonorrhea and syphilis in State-cooperating venereal disease clinics.

4. Observation during the first 2 weeks of the principles and practices of contact interviewing and investigation. The student is assigned to observe in several districts, each district representing a different phase of the program.

5. Assignment of the student as assistant to a public health field nurse for the remaining 6 weeks. She is given cases to work up, including contacts, suspects, and lapsed cases. At first, the field nurse accompanies the student. Subsequently, 1 to 2 weeks later, the student is assigned to investigate cases by herself, but at the end of each day she reports to her field supervisor and discusses her cases with her. She also visits patients accompanied by the supervisor, who observes the following:

- Does the student establish rapport easily?
- Is the student aware of other problems the patient may have?
- What is the impact of this disease on the patient?
- What is the impact of this disease on the family?
- Are there any problems of the family which directly or indirectly contributed to the devel-

Reported venereal disease contacts and suspects in Boston, Mass., by age and marital status, 1955

Age group	Single	Married	Widowed	Divorced	Separated	Not stated	Total
Contacts							
Under 1	95	0	0	0	0	0	95
1–4	20	0	0	0	0	0	20
5–9	26	0	0	0	0	0	26
10–14	20	0	0	0	0	0	20
15–19	49	10	0	1	0	15	75
20–24	139	69	1	8	22	94	333
25–29	63	64	1	6	28	96	258
30–34	20	46	1	7	20	67	161
35–39	8	31	4	5	9	39	96
40–44	1	16	0	4	9	17	47
45–49	6	14	0	2	1	3	26
50–54	3	9	1	1	1	4	19
55–59	0	7	0	0	1	3	11
60–64	0	6	0	0	0	0	6
65–69	0	8	0	0	1	1	10
70 and over	0	2	1	0	0	0	3
Not stated	9	40	0	4	2	40	95
Total	459	322	9	38	94	379	1,301
Suspects							
Under 1	0	0	0	0	0	0	0
1–4	0	0	0	0	0	0	0
5–9	3	0	0	0	0	0	3
10–14	2	0	0	0	0	0	2
15–19	7	0	0	0	0	2	9
20–24	13	14	1	0	2	11	41
25–29	18	19	0	1	3	6	47
30–34	12	24	0	1	10	7	54
35–39	7	29	0	4	8	9	57
40–44	3	20	5	4	3	11	46
45–49	2	13	5	4	3	8	35
50–54	4	19	2	1	6	7	39
55–59	7	17	5	0	4	7	40
60–64	6	19	3	2	4	3	37
65–69	6	14	15	1	4	1	41
70 and over	5	4	5	2	2	0	18
Not stated	0	5	0	0	0	10	15
Total	95	197	41	20	49	82	484

opment of venereal disease or sexual promiscuity; for example, divorce, separation, desertion, maladjusted marriage, illegitimacy, unfavorable environment?

- Are there other problems in the family not related to venereal disease? These may be medical, social, economic, moral, or environmental.
- Is the patient pregnant? If so, does the student inquire about prenatal care?
- Is the student aware of other agencies, and does she refer problems to them?
- Is she an effective teacher?

The system of instruction used by the division of venereal diseases has several advantages. First, one qualified field instructor is assigned to each student. Second, the student is prepared for the actual "doing" experience by didactic and observational teaching. Third, there is an adequate caseload and a sufficiently varied group of patients for the students to gain experience in the areas enumerated above; this is apparent when one examines the amount and quality of the case material.

During 1955 a total of 1,785 contacts and suspects were investigated in Boston by the division of venereal diseases. These represent the potential family case studies made by the division staff. The distribution by age groups and marital status, shown in the table, indicates that the students had an opportunity for experience in the specific areas of family health mentioned.

During 1955, 16,986 visits for venereal dis-

ease were recorded in the Boston hospitals to which the graduate nurse students were assigned during their field training. This gave the students an opportunity to gain experience in contact interviewing and also the chance to see a number of varied types of clinical cases.

We conclude that the students had adequate field supervision and that they were exposed to a sufficient number and diversity of cases to give them experience in the specific areas of family casework listed above.

Staff Education

An interested and well-informed staff is basic to the success of any program. The division of venereal diseases, therefore, has a continuing educational program designed to meet the needs of the staff. Not only are the latest fruits from research laboratories reported, but the staff participates in the division's research projects.

Each member of the nursing staff has been sent to the Alto Medical Center in Georgia for intensive postgraduate training in contact interviewing. Furthermore, staff education meetings are held regularly each month from October through June.

At the education meetings, the staff nurses have an opportunity to hear guest lecturers preeminent in their fields, many of whom are from other States. For example, during the fiscal year 1955, our out-of-state guest speakers included Dr. Evan Thomas of New York and Dr. John Cutler of Washington, D. C. The former discussed immunity in syphilis, and the latter, the results of the long-term study of untreated syphilis. Another guest speaker was Dr. Roy E. Ritts, Jr., of the Peter Bent Brigham Hospital and Harvard Medical School, who spoke on present-day antibiotics and some of the new antibiotics under research study. Dr. John L. Fromer, chief of allergy and dermatology at the Lahey Clinic, discussed allergy in syphilis, thus bringing into clinical focus the discussions of Drs. Thomas and Ritts. At one meeting, a symposium on gonorrhea was held. The guest speakers were Dr. B. G. Clark, assistant professor of urology, and Dr. George W. Mitchell, professor of gynecology, at Tufts University School of Medicine. One spoke on gonorrhea in the male, and the other, on gonorrhea in the female.

Principles of Supervision

During her field experience, the student becomes de facto a member of the venereal disease program staff and is subject to the rules and policies of the division. However, supervision of all workers, including the students, is based on democratic principles. The impact of this approach on the student may be deduced from the excerpts of students' evaluation of their field instruction.

"The entire situation was new to me, and I believe that this experience will broaden my narrow outlook on venereal disease and its effect upon family living. Most valuable to me was to observe workers functioning in a highly democratic atmosphere. I am more convinced than ever that this is the way an organization should be administered."

"This experience should be part of the education of every graduate nurse. What impressed me most of all was the sense of individual responsibility on the part of the epidemiologists. . . . They are presumed to be mature, reliable, professional people and are treated as such at all times."

While she is with the division of venereal diseases, the student nurse participates in the staff education program and in staff conferences. Individual conferences are held with the director, the supervisory nurses, and the field instructors. With the latter, they are held daily.

Once each week, the students return to the school for seminars with other nurse students who are affiliated with other agencies. A representative of the division of venereal diseases supervisory staff is present. The seminar is conducted by the faculty members, and the students are asked to relate their experiences and bring up cases for discussion. The entire group informally discusses the cases presented from the point of view of management, errors of omission or commission, the use of existing agencies, the current thinking in that area of public health, and the achievement of the objectives of family case work. In addition, the student is asked whether her own objectives of the field

experience have been attained and whether she has been forced to change her concepts of public health either by broadening them or making a radical readjustment.

Evaluation of the Students

Evaluation of the students' work is both objective and subjective. Fortunately, in venereal disease control there are objective yardsticks which measure the efficiency of a worker. These are the various indexes, such as the contact-patient index, the ratio of contacts discovered to contacts named, the epidemiological index, and the lesion-to-lesion index. These objective evaluations are applied to the student. The subjective evaluation is based on the reports of the field and central office supervisors. Every field supervisor is required to give a personal evaluation of the student every 2 weeks. A final written report on the student is submitted at the conclusion of the field instruction by the director of the division of venereal diseases.

The last phase of the evaluation is the student's opinion of the agency and the quality of instruction received. This evaluation may be best summed up in the words of the students themselves:

"This was by far the most interesting 8 weeks I have ever spent. It made me aware of the problems involved in cleaning out venereal disease from my city. I was also fortunate in that I had an opportunity to observe what these people are doing in the way of an inservice program in order to keep abreast of things in their own field. Then the same week we were able to observe the close association between the civilians and the armed services in an attempt to keep the venereal disease rate down. It is gratifying to see how much is actually being done that we never hear about. I think that the epidemiologists are the most interested of all public health nurses in the education of nurses."

"This field experience was very educational and interesting. The visits to the homes in the district were by far the most valuable to me, and I now wish that the training could have been longer. I regard this as one of my very best experiences even though I do not plan on public health nursing for a career. When taking care of hospitalized patients, I will have a better understanding of the patient, particularly from such an environment and with great emotional needs."

Summary

The shortage of adequate facilities for field instruction in public health led us to investigate the use of a specialized public health agency for generalized experience. On critical examination, the division of venereal diseases of the Massachusetts Department of Public Health was found to be a suitable organization for this purpose.

This agency has adequately trained and well-qualified personnel. It provides one qualified field supervisor for each graduate nurse student, a ratio which is seldom achieved in other agencies.

An adequate supply and a diversity of cases provide full opportunity for experience in family health teaching in the areas of prenatal and postnatal care, infant, preschool, school, adolescent, and adult health, geriatrics, chronic diseases, and rehabilitation.

The division of venereal diseases has a well-organized and effective staff education program in which the nursing students participate.

Applied Epidemiology of Gonorrhea in British Columbia

By A. JOHN NELSON, M.B., Ch.B., D.P.H.

MOST HEALTH JURISDICTIONS in North America have substantially reduced morbidity from venereal disease during the past decade. British Columbia has achieved these gains since 1946, when the Province entered the postwar era with the highest rates for gonorrhea and infectious syphilis of any Canadian Province. Since that date the infectious syphilis rate has declined markedly, but the successes achieved in gonorrhea control have been much less spectacular (table 1). Hence, gonorrhea must be considered the major venereal disease problem.

No true measure of the incidence and prevalence of gonorrhea exists. Reporting is notoriously incomplete, and figures based upon morbidity reports can be used only as a partial and minimum indication of both incidence and prevalence and, at most, to evaluate trends rather than to obtain the true picture of the gonorrhea problem.

Trends in morbidity reporting of gonorrhea from 1944 through 1955 for Canada and the continental United States are shown in figure 1. In both countries, following the peak incidence of 1946, case rates declined progressively until 1951; since then, the rates have remained virtually static. These trends may be compared with those for gonorrhea morbidity reporting in British Columbia and adjacent Provinces over the same period (fig. 2). British Columbia participated with other Provincial health jurisdictions in the general decline in gonorrhea incidence which followed the postwar peak of 1946.

The factors contributing to this general decline in gonorrhea incidence may be analogous to those described by Moore (*1*) in connection with the overall decline in the incidence of syphilis. However, it appears unlikely that the immediate postwar decline in gonorrhea was attributable to the application of control measures per se, a conclusion which is borne out by the subsequent stationary or rising trend in the incidence of gonorrhea in most areas.

In British Columbia the postwar decline in gonorrhea incidence ceased as early as 1948, and gonorrhea rates were more or less stationary through 1949 and 1950 (fig. 2), whereas in Canada and the continental United States the decline in gonorrhea incidence continued until 1951. It was concluded that, if further advances were to be made in the control of gonorrhea in British Columbia, the objectives and activities of the control organization would have to be reoriented and new approaches and answers to those apparently refractory problems which were hindering our efforts would have to be devised.

Since 1949, and at an accelerated pace since 1952, a series of studies designed to shed light upon the public health problem presented by gonorrhea and upon the reasons for the relative failure of the control program has been carried on. The objectives of the studies were the elucidation of basic epidemiological information

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Table 1. Number of new cases of venereal disease reported and rate per 100,000 population, British Columbia, 1944–55

Year	Infectious syphilis		Gonorrhea	
	Number cases	Rate per 100,000 population	Number cases	Rate per 100,000 population
1944	380	40. 8	3, 358	360. 3
1945	645	68. 0	3, 711	391. 0
1946	834	83. 2	4, 618	460. 4
1947	575	55. 1	4, 056	388. 6
1948	239	22. 1	3, 608	333. 5
1949	139	12. 5	3, 694	331. 6
1950	61	5. 4	3, 627	319. 0
1951	36	3. 1	3, 336	286. 4
1952	33	2. 7	3, 098	258. 6
1953	26	2. 1	2, 968	241. 3
1954	17	1. 3	2, 668	210. 7
1955	14	1. 1	2, 494	191. 1

SOURCE: Notification of Venereal Infection, form N.H.I., Department of National Health and Welfare, Canada.

regarding this infection and the development of control measures based upon applied epidemiology. The purpose of the present paper is to report upon what has been achieved to date.

Contact Tracing

Comparison of the relative advantages and disadvantages of the three major case-finding activities—education, screening of selected groups, and contact tracing—suggested that effective contact tracing offered the greatest possibilities for a focal attack upon the gonorrhea problem. By this time, the hope that penicillin therapy was so highly specific for gonococcal infection that it was sufficient to treat only known cases and that, with the onset of symptoms, contacts could be relied on to seek medical care had been disproved. Therefore, in 1949 it was decided to develop and improve contact tracing as the strategic epidemiological weapon against gonorrhea.

Prior to 1949, contact tracing had been pushed to the utmost against syphilis, which was considered to be the more serious venereal disease, whereas contact tracing against gonorrhea, although included in the case-finding program, had been haphazard and unorganized. Thus, followup of readily identifiable contacts of gonorrhea cases reported by venereal disease clinics was pushed. Rather less effort was made to ascertain and follow up the contacts of cases reported by private physicians. Little was done to identify the reservoir of infection responsible for perpetuating the disease, and the efficiency and achievement trends of contact tracing were not quantitatively assayed.

From 1949 on, all patients seen at venereal disease clinics were interviewed for contacts. Since many gonorrhea patients were first diagnosed by private physicians, who gave inadequate or no contact information on their morbidity reports, all Provincial health units and other health agencies working in close contact with local private physicians were instructed that every gonorrhea morbidity report, "prior to submission to the division of venereal disease control, should be scrutinized for contact information. Where the attending physician fails to list a minimum of one contact per notified case, the health unit should take steps to see that he is made aware of the importance of his contribution to the overall control program. The modus operandi here should be for the health unit to make an offer of aid (in the elicitation and followup of contacts) so convincingly extended and so helpfully applied as to earn willing acceptance."

Gonorrhea contact indexes (per 100 reported cases) were maintained in order that contact tracing might be quantitated to determine its efficiency and to permit comparative evaluation

Figure 1. Number of gonorrhea cases per 100,000 population, Canada and the United States, 1944–55.

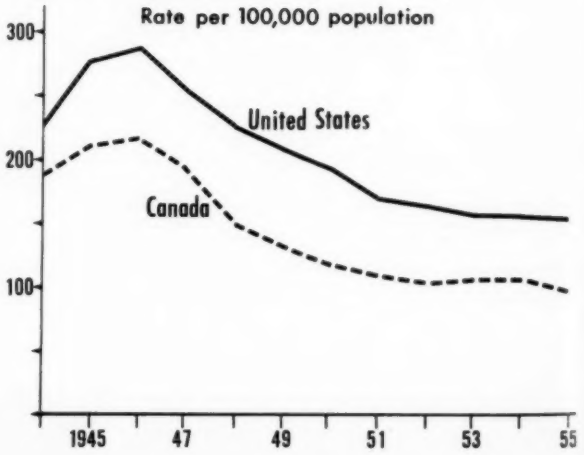
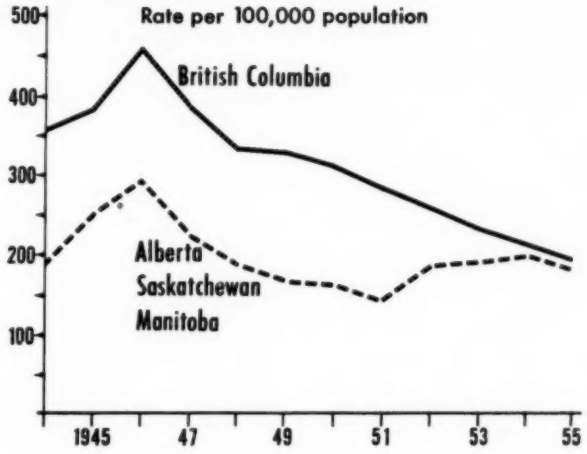


Figure 2. Number of gonorrhea cases per 100,000 population in British Columbia and in Alberta, Saskatchewan, and Manitoba, Canada, 1944–55.



of the contributions made to the program by private physicians and trained epidemiological workers from the venereal disease clinics. Critical reevaluation of the epidemiological data for 1949–53 reveals that these measures, undertaken as part of the intensive contact tracing program, were moderately successful.

Epidemiological Studies

Epidemiological studies made in 1952 and 1953 were perhaps the most important contribution to our understanding of the epidemiology of gonorrhea and were the determining factor in the introduction of selective contact tracing. These studies (*2*) brought out that:

1. One venereal disease patient in every three becomes a repeater.

2. There is an important sex differential in gonorrhea reporting. In 1944–52 the male to female ratio was 2.50 (table 2). This suggests the existence of a reservoir of infected and undiagnosed females and points to the necessity for increased case-finding efforts among women. In 1952, 12.7 percent of all women examined at the Vancouver Gaol Examination Centre had untreated gonorrhea.

3. A successful epidemiological attack upon gonorrhea involves recognition of the fact that the reservoir of infection is made up of female patients, most of whom are unidentified, and that the objective of epidemiology is to bring the infected woman to treatment before she can infect a third person. This means that the female with undiagnosed gonorrhea must be identified through her recent male contact and be brought to treatment within hours.

A focal attack upon this reservoir of gonorrhea was incorporated in a four-point "speed-zone" project instituted by the division of venereal disease control in August 1953. The objectives of this project were:

1. To interview all male gonorrhea patients for information regarding their female contacts during the 6-day period preceding onset of symptoms. It was believed that the male patient could be used as a signpost leading to an infected female contact or to a potential carrier. Efforts were concentrated upon female contacts of known infected males in the belief that infected male contacts of known infected females would come to treatment voluntarily.

2. To locate identifiable female contacts within a matter of hours in order to minimize numerical opportunities for dissemination of infection.

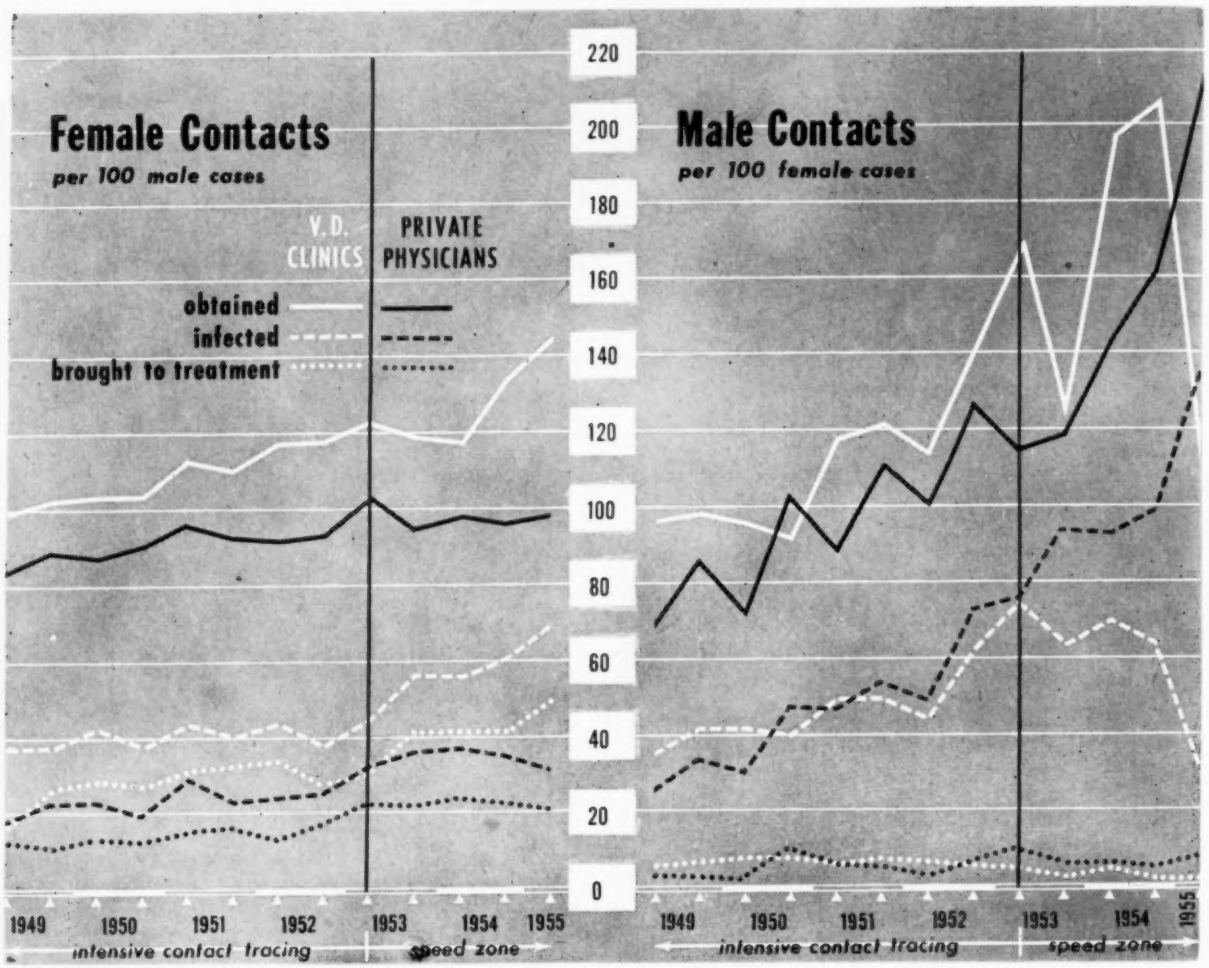
3. To treat female contacts immediately as suspect carriers, although, when practicable, urethral and cervical smears and cultures were to be taken before treatment. This procedure appeared justifiable because it is difficult at any time to make a bacteriological diagnosis of gonorrhea in women and even more difficult to

Table 2. New cases of gonorrhea reported, by sex, British Columbia, 1944–52

Year	Number of cases			Male/female ratio
	Total	Male	Female	
1944	3, 358	2, 460	898	2. 74
1945	3, 711	2, 682	1, 029	2. 61
1946	4, 618	3, 244	1, 374	2. 36
1947	4, 056	2, 925	1, 131	2. 59
1948	3, 608	2, 575	1, 033	2. 49
1949	3, 694	2, 513	1, 181	2. 13
1950	3, 627	2, 428	1, 199	2. 03
1951	3, 336	2, 461	875	2. 81
1952	3, 098	2, 352	746	3. 15
Total	33, 106	23, 640	9, 466	2. 50

SOURCE: Notification of Venereal Infection, form N.H.I., Department of National Health and Welfare, Canada.

Figure 3. Semiannual gonorrhea contact, epidemiological, and brought-to-treatment indexes, by sex, British Columbia, 1949–55.



determine that a given woman is free of infection.

4. To control community conditions facilitating the acquisition and spread of venereal disease, which was considered to be just as important in an epidemiological program of this nature as it was formerly.

Evaluation techniques were devised by developing achievement indexes, to determine whether the first two objectives were being met.

Since interviewing male patients for information regarding their significant female contacts is the crux of selective contact tracing, the contact, epidemiological, and brought-to-treatment indexes of Iskrant and Kahn (*3*) were used, on a semiannual sex-specific basis, for evaluation of gonorrhea contact tracing. More specifically, the sex-specific brought-to-treatment index obtained from the followup of female contacts of male patients was regarded as the critical index of achievement in selective contact tracing.

Because the value of specialized contact investigation would probably be in direct proportion to the length of time by which the infectious period was shortened, followup studies were instituted to measure the elapsed time between naming of contacts and date of treatment of such contacts.

By using these techniques, the achievements of gonorrhea contact tracing during both the 5-year intensive contact-tracing period (January 1, 1949, through June 30, 1953) and the 3-year speed-zone period (July 1, 1953, through June 30, 1955) could be evaluated and contributions to the program by private physicians and

by trained epidemiological workers from the venereal disease clinics could be compared (fig. 3). In the material which follows, all achievement indexes are based upon 100 reported cases of gonorrhea in either sex. For example, the contact indexes for males measure the number of female contacts obtained by interviewing 100 male gonorrhea patients.

Although field investigation of male contacts to female gonorrhea patients was not considered worth while because of the belief that infected male contacts would come to treatment of their own accord, it was felt that useful information could be obtained by matching records. The semiannual achievement indexes in the right-hand column of figure 3 indicate that most infected male contacts come to treatment voluntarily and that, as measured by the brought-to-treatment indexes, contact tracing, per se, is not and never has been a productive method of finding cases of gonorrhea in males.

A progressive and marked increase in the female contact index obtained by private physicians occurred during both the intensive contact-tracing and the speed-zone periods. Private physicians are in a position to obtain information from females regarding their male contacts. Although this information will not increase the discovery of new cases of gonorrhea in males, it may be assumed that private physicians could effect a like improvement in the male contact index by questioning male patients regarding their female contacts.

The critical indexes are those which measure the results of investigation of female contacts of male patients and should reflect both effort and achievement in reducing the reservoir of gonorrhea infection among females. The data in the left-hand column of figure 3 indicate that, over the entire period 1949–55, clinic epidemiological workers increased their contact index for males from 99 to 143. Private physicians improved their contact index from 84 to 103 during the intensive contact-tracing period but were unable to effect any further improvement and have not been able to maintain this critical index above 100 (1 female contact per reported male patient).

Similar trends are apparent in the corresponding epidemiological indexes. Clinic workers increased their epidemiological index for males from 37 to 44 (19 percent) during the intensive contact-tracing period and, with the advent of selective contact tracing, further improved this index to a high of 69 (57 percent). The trend of the epidemiological index for private physicians followed the trend of their contact index, an early and marked increase in the epidemiological index from 19 to 33 (74 percent) during the intensive contact-tracing period being followed by a more or less stationary trend.

Results

In terms of ultimate achievement, as measured by the male brought-to-treatment indexes, during the intensive contact-tracing period the clinic epidemiologists almost doubled the number of new cases of gonorrhea discovered in females as compared with the number discovered during early 1949 and subsequently trebled this number in the speed-zone period. The pattern of the brought-to-treatment index for private physicians approximates the pattern of their contact and epidemiological indexes, with an increased yield of new cases among females during the intensive contact-tracing period followed by a period during which no further improvement was made.

Table 3. Cumulative percentage distribution of new cases of gonorrhea among females brought to treatment through contact investigation, according to time taken to bring under treatment by clinics of the division of venereal disease control, British Columbia, July 1, 1952–December 31, 1954

Time between being named as contact and treatment (days)	Control period		Speed-zone period	
	Number of cases	Cumulative percentage	Number of cases	Cumulative percentage
Less than:				
1	10	3. 73	38	8. 30
2	27	10. 07	86	18. 78
4	52	19. 40	140	30. 57
8	95	35. 45	225	49. 13
15	145	54. 11	311	67. 91
31	207	77. 24	385	84. 07
91	249	92. 91	448	93. 82
365	268	100. 00	458	100. 00

Table 4. Number of new cases of gonorrhea among females brought to treatment through contact investigation, according to time taken to bring under treatment by clinics of the division of venereal disease control, British Columbia, July 1, 1952–December 31, 1954

Time between being named as contact and treatment (days)	Number of cases brought to treatment		
	Control period	Speed zone period	Total
Less than 1	10	38	48
1	17	48	65
2–3	25	54	79
4 or more	216	318	534
Total	268	458	726

By means of these sex-specific contact, epidemiological, and brought-to-treatment indexes, it has been possible to analyze in some detail our data for the period 1949–55 and to demonstrate improvement in the accomplishments of contact investigation in gonorrhea control. However, there is considerable room for improvement in the contributions which might be made by both clinic epidemiologists and private physicians in particular toward the whole program.

Contact investigation in gonorrhea control is not being exploited to the utmost unless and until private physicians (*a*) are thoroughly indoctrinated with the potential importance of their contribution to contact tracing, (*b*) are made aware of the importance of the undiagnosed reservoir of gonorrhea in females, and (*c*) acquire new attitudes and skills in interviewing male gonorrhea patients for female contacts. The increasing importance of the private physician's role in gonorrhea control is also evident from the fact that whereas in 1949 private physicians submitted 36.6 percent, clinics, 60.6 percent, and other agencies, 2.8 percent of all morbidity reports, by 1955 these figures were 45.2 percent, 35.5 percent, and 19.3 percent, respectively.

It is important to locate all female contacts within a matter of hours of identification in order to minimize numerical opportunities for dissemination of infection. Therefore, it is useful to know not only the contact index but also the elapsed time between the identification of the female contact and her examination and treatment. Indeed, the success or failure of the speed-zone project must be gauged by the rapidity with which infected females are brought to treatment, thus shortening the infectious period.

In order to determine whether a significantly larger number of infected female contacts were brought to treatment earlier by speed-zone techniques than by conventional contact tracing, a special study was made on clinic patients only. The numbers of new cases of gonorrhea in females brought to treatment through contact investigation during the 13 months July 1, 1952, through July 31, 1953, the latter part of the intensive contact tracing period, with the time lapse in days between identification as a contact and treatment, were compared with the numbers brought to treatment during the 17 months August 1, 1953, through December 31, 1954, the early part of the speed-zone period. The relevant data are given in tables 3 and 4.

During the speed-zone period, approximately 19 percent of all females brought to treatment were treated within 48 hours after they were named as contacts; 30 percent were treated within 4 days; and 84 percent within 1 month (table 3). The corresponding figures for the control period were 10 percent, 19 percent, and 77 percent, respectively. Statistical treatment of the data in table 4 indicates that introduction of speed-zone epidemiological techniques into the clinics of the division of venereal disease control in British Columbia was effective in significantly reducing the time between being named as a contact and treatment of female gonorrhea patients brought to treatment through contact investigation. This, in the final analysis, decreased the chances of the promiscuous male population acquiring gonorrheal infection.

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how are we doing in public health?

Today, the growth and movement of population add to the complexity and multiplicity of problems of public health, with a future expectation of 200 million persons in the United States. In great unserved areas some 40 million people live, while others are not served too satisfactorily in additional geographic areas of this country. We cannot close our eyes to the impact of other changes. Close to a third of the Nation's families changed addresses in a recent 3-year period; 10 million families moved to another State; there is a tendency toward early marriage . . . thousands of women confront a prospect of 8 to 9 years of widowhood; urbanization is accompanied by a lessening of effective relationships among individuals . . . population growth has outstripped the increase in professional public health workers.

IRA V. HISCOCK, Sc.D.
President, American Public Health Association, 1955–1956
From the presidential address at the
Eighty-fourth annual meeting, November 13, 1956

SUMMARIES OF SELECTED PAPERS
from the 84th annual meeting
of the
AMERICAN PUBLIC HEALTH ASSOCIATION
and related organizations
held at Atlantic City, N. J.
November 12–16, 1956

The APHA Conference Report

With the assistance and cooperation of the authors, the staff of *Public Health Reports* has summarized some 70 of the papers presented at the 84th annual meeting of the American Public Health Association and related organizations in Atlantic City.

Summaries selected for publication in the following pages are intended to present information which may not otherwise have been given adequate notice. Omitted from these selections are papers which were known to have been scheduled for early publication in the *American Journal of Public Health;* papers whose authors provided no copies for this journal; and papers which, for one reason or another, did not seem suited to summarization.

No papers on laboratory methods are summarized here because of the understanding that they would have early publication, at least in brief form, in the APHA Journal.

Other papers presented at the conference are under consideration for publication in subsequent issues of *Public Health Reports.*

Names of sections and affiliated organizations which sponsored papers presented at the conference are listed below.

Sections of the American Public Health Association

Dental Health
Engineering and Sanitation
Epidemiology
Food and Nutrition
Health Officers
Laboratory
Maternal and Child Health
Medical Care
Mental Health
Occupational Health
Public Health Education
Public Health Nursing
School Health
Statistics

Related Organizations Participating in the Conference

Associations

American Association of Public Health Physicians
American Association of Registration Executives
American Psychiatric Association
American School Health Association
Association of Business Management in Public Health
Association of Labor Health Administrators
Association of Schools of Public Health
Association of State Maternal and Child Health and Crippled Children's Directors
National Tuberculosis Association
Public Health Cancer Association

Conferences

Directors of Public Health Laboratories
Health Council Work
Medical Care Teaching
Municipal Public Health Engineers
Nurse Directors
Public Health Veterinarians
State and Provincial Public Health Laboratory Directors

Other

American College of Preventive Medicine
Laboratory Problems Related to Health
Military Government-Civil Affairs Public Health Society
National Citizens Committee for the World Health Organization
National Sanitation Foundation
Nurse Mental Health Consultants
State Sanitary Engineers

Nutrition . . .

Sitosterol in Corn Oil, A Cholesterol Depressant

A recent experiment suggests that the presence of sitosterol in corn oil is at least in part responsible for the depressant effect of this fat on plasma cholesterol, reported Dr. J. M. R. Beveridge, in a review of his own work and that of other investigators on fat metabolism. Dr. Beveridge is at Queens University, Kingston, Ont., Canada.

His research relates to the established association between high plasma lipid levels and a high incidence of atherosclerosis. Whether or not the relationship is one of cause and effect is not yet known, Beveridge pointed out. However, he considers it justifiable, and indeed advisable, "to regard high plasma lipid concentrations as a factor that potentiates the development of atherosclerosis in humans." Diet, of all the factors that affect the concentration of cholesterol in the blood, is undoubtedly the most important, he said.

In this experiment, 52 healthy young male subjects ingested a diet high in butterfat for an initial 8-day period. Then they were divided into five groups, one of which received beta-sitosterol as a supplement. Two groups received alpha-tocopherol in differing amounts; one was transferred to a diet high in corn oil; and another was continued on the butterfat diet.

The group on the sitosterol and the one on the corn-oil diet showed a highly significant decrease in plasma cholesterol, Beveridge stated. The decrease for the former was 21.2 percent; for the latter, 23.1 percent. The alpha-tocopherol, however, had no effect, he added.

One possible reason for this unexpected result with sitosterol, he claimed, is that it was distributed uniformly throughout the formula-type ration, in contrast with the usual procedure of giving it in the form of a suspension before, during, or just after meals.

A number of investigators had shown that beta-sitosterol brings about a cholesterol decrease in some hypercholesterolemic individuals, Beveridge remarked, but it had not been found to be effective for persons with plasma cholesterol concentrations of less than 200 mg. per 100 ml. plasma.

Animal and Vegetable Fat

Earlier experiments, according to Beveridge, demonstrated that animal fat in the diet actively raises plasma cholesterol levels and that vegetable fat (corn oil) actively lowers the levels.

In all his experiments, he used "homogeneous diets comprised of a relatively few components of definitely known composition that could be accurately made up and dispensed." This regimen, he maintained, permitted "excellent control over caloric intake and complete control over the proportion of calories derived from the main components of the diet and also regulated the mineral and vitamin intake."

The initial experiments with this regimen showed (*1*) that dietary cholesterol in amounts up to about 700 mg. per day had no effect on the concentration of plasma cholesterol and (*2*) that corn oil in the diet resulted in significantly lower plasma lipid levels than did equi-caloric amounts of butter fat.

A subsequent experiment attested to the "presence of a factor in corn oil that actively lowers plasma cholesterol levels," Beveridge stated. After a fat-free diet for 8 days, subjects were placed on a corn-oil diet for another 8 days. After the first 8 days, the plasma cholesterol level had decreased an average of 22.2 percent; after the second 8 days, it had decreased an additional 15.2 percent.

The most recent experiments have investigated the nature of the cholesterol depressant and elevating factors. There appear to be two factors in butterfat that tend to elevate plasma cholesterol levels, Beveridge said, one in the first fraction, presumably due to the nature of the unsaponifiable fraction or the short-chain fatty acids, and the other in all fractions.

The 9 charts on the following pages are taken from recent publications issued in limited editions by the Division of Public Health Methods, Public Health Service: a chart book on health status and health manpower, issued February 1956; and a chart book on health service manpower prepared for the October 24, 1956, meeting of the National Advisory Health Council. The latter has been reissued as PHS Publication No. 511.

Sees Future for Antibiotics As Food Preservative

Assets and limitations of antibiotics in preserving food were surveyed by Dr. F. E. Deatherage, professor of agricultural biochemistry, Ohio State University.

He reported that certain of the broad spectrum antibiotics have shown great potential value in delaying the spoilage of perishable fresh food, and in proper usage there appears to be no public health hazard. But he emphasized that each application must be studied individually. Not all antibiotics act the same way nor do all foods spoil the same way.

While the tetracyclines, particularly chlortetracycline, may be effective in preserving meat, penicillin is worse than nothing, for it promotes a rapid development of the normal spoilage flora, Deatherage explained. Streptomycin is of no value in preserving the high protein foods, yet it is quite effective for bacterial soft rot of certain fresh vege-

tables. All of these antibacterial agents are useless against fungal spoilage of many fruits and vegetables.

Many new and striking developments in antifungal agents are on the horizon, he said. Control of brown rot in peaches has been demonstrated. Griseofulvin and other unnamed antifungal agents show much promise in controlling phytopathogenic fungi as well as yeasts and molds which cause deterioration in many foods.

Complements Refrigeration

Antibiotics do not sterilize food, Deatherage pointed out, but, like refrigeration, they may inhibit the growth of bacteria already there. Both are most effective in controlling spoilage when the food is handled in the most sanitary manner. Neither can be used to upgrade a spoiled or inferior product. Antibiotics and refrigeration are complementary. Both can do more than either alone in controlling spoilage. But each can produce its effect without the other.

Summing up the effect of chlortetracycline, Deatherage reported that infusion of whole or half carcasses of beef results in a keeping time of at least 72 hours, even when the internal temperature of the meat remains in the 70–85° F. range. It greatly retards slime formation and surface spoilage in the carcass, cut, or ground forms of meat, although the length of holding time depends on the temperature and original bacterial load. For ground beef originally containing 200,000 organisms per gram, 2 p.p.m. of chlortetracycline will increase the usable life at 10° C. from 2 to as much as 9 or more days. The same holds true for pork sausage. Generally, the use of an effective antibiotic on a perishable food, such as poultry, milk, and eggs, will increase the usable life 2 to 3 times.

Although antibiotics do not offer permanent preservation, Deatherage said, their addition to refrigerated shipments in this country can reduce the waste in meat caused by temperature fluctuations in transit from packer to distributor and retailer.

In countries where perishable foods are not distributed under refrigeration, antibiotics will afford a few days of keeping time for fish, milk, poultry, and meat without the high capital outlay for equipment. This would mean more meat for more people in places where animals must be brought to the point of consumption and slaughtered and eaten the same day.

Deatherage concluded that the use of antibiotics in food is a relatively new facet of an old concept: man's use of nature's biological controls for his own advantage. Control of one organism, either microscopic or macroscopic, by another through chemical means is widespread throughout nature.

Puerto Rican Health Group Improves Island's Nutrition

The Puerto Rican Nutrition Committee has done much to alleviate borderline nutritional deficiencies in Puerto Rico, said Marta Coll-Camalez, U. S. Department of Agriculture, Caribbean Area Office, Santurce, Puerto Rico.

Faulty food habits and low income are two of the main factors responsible for Puerto Rico's nutritional deficiencies, she stated. The typical diet is low in high quality protein, vitamin A, and calcium.

The committee attempts, through its education programs, and with the help and cooperation of government agencies, to improve food habits without changing the basic structure of the dietary pattern and to increase the per capita income through social and economic programs.

In the last few years, the committee's activities have made the use of enriched flour and enriched rice compulsory throughout the island. It has developed a "basic four" chart instead of the "basic seven" and has campaigned for the consumption of nonfat dry milk solids among the low-income group that cannot afford to buy whole milk.

Other educational programs include a film strip and a movie about milk and its importance in the diet and a film strip on calabaza (squash).

Campaigns are under way to fight misleading advertising concerning the nutritional value of certain products widely sold in the island, to discourage the adding of vitamin D to fresh milk, and to discourage importers of milk from using vitamin D as a selling point.

The committee is also studying diets served at government institutions. Recommendations will be made to correct deficiencies that are found.

Social Science Offers Key To Folkway Food Barriers

Collaboration between social scientists and health workers in nutrition programs was advocated by John Cassel of the School of Public Health, University of North Carolina.

Food habits are among the oldest and most deeply entrenched aspects of many cultures and cannot be easily changed or, if changed, can produce a further series of unexpected and often unwelcome reactions, Cassel said.

Before attempting to introduce innovations into an area, health workers must first know intimately and in detail the people's beliefs, attitudes, knowledge, and behavior. Second, they must determine the pattern or system into which these customs or beliefs fit.

Here, Cassel said, are contributions social scientists can make to health programs, particularly in helping determine why certain practices obtain, in predicting the difficulty in changing them, and in indicating the most helpful techniques.

Social scientists can also assist in defining subcultural groups within an area, he stated. In southern Illinois, for instance, social scientists have distinguished eight separate subcultural groups, each with their own set of attitudes toward food

and none of them based on knowledge of or interest in nutritional values. He termed concentration of the nutritionist's time on specific groups more efficient than a broad areawide program.

Zulu Food Pattern

To illustrate the relevance of social and cultural factors to health programs, Cassel related the experience over 12 years of the Polela Health Center in introducing green vegetables, eggs, and milk into the food pattern of a Zulu community in the Union of South Africa.

In 1940 the existing diet consisted mainly of a single staple, corn, a large percentage of it refined cornmeal purchased with money sent home by migrant laborers. Supplementary foods were dried beans, negligible amounts of milk, meat, and wild greens, and potatoes and pumpkins in season.

Eighty percent of the people exhibited marked stigmata of malnutrition. Pellagra and kwashiorkor were common.

The first task was the refutation of the commonly held belief of the people that this diet was the diet of their ancestors. "Had not their ancestors been strong and healthy, mighty men of valor and military deeds?"

When the health educators, all of them Bantu speaking the Zulu language, assisted groups in realizing that much of their present diet was not so traditional as they had previously maintained, the older people, with their roseate views of the "good old days," frequently led the groups in condemning the modern inferior diet.

No deep-seated symbolic values were associated with green vegetables and eggs, and their introduction mainly hinged on arduous education and demonstration. The people had enjoyed the wild greens which soil erosion had depleted. They were shown how vegetables could be cultivated in gardens. The answer to the commonly held attitude that it was uneconomical and greedy to eat an egg which would later hatch into a chicken was improvement in the yield to provide enough eggs for both eating and breeding.

The Milk Barrier

Milk was associated with deeply rooted beliefs and customs, however, and increasing the consumption proved most difficult and complex.

Only members of the kin group of the head of a household could use milk produced by that man's cattle. His wife was excluded because she did not belong to her husband's kin group. Milk was also usually excluded from the diet of girls after puberty. During her menses or when pregnant, a woman was thought to exert an evil influence on cattle.

To these people anything that might have an evil influence on the cattle would affect the relationship between a man and his ancestors, on whose goodwill he depended for protection against misfortune and ill health.

Stressing the importance of milk as an ideal food for lactating or expectant mothers was to no avail. Analysis of the underlying beliefs indicated clearly that the barrier to greater milk consumption lay in the link between milk and the specific cattle it came from. Powdered milk was the solution. It came from cows which did not belong to any member of the tribe or any other related groups.

In addition to applying social science concepts, Cassel cautioned nutritionists against the tendency to be "culture bound." Too often, he said, food patterns which differ from the nutritionist's familiar and customary experiences are automatically labeled "bad." Attitudes and beliefs which differ from their own are regarded as illogical, misinformed, or wrong.

Current nutritional theory is based largely on animal experimentation and work with people living in a particular cultural milieu, chiefly Western culture, he pointed out. We have little evidence to indicate that all of this theory is applicable to all people irrespective of their way of life.

Vegetable Mixes Offer Adequate Basic Diet

Vegetable mixes as the basic diet may be the most economical solution to protein malnutrition in countries with an inadequate supply of meat, according to Dr. James B. Allison of Rutgers University.

He reported that an agricultural economy designed to provide a mixture of vegetable proteins with a relatively high nutritive value is now being studied by the Institute of Nutrition of Central America and Panama, under the direction of Dr. Nevin Scrimshaw, in cooperation with agricultural agencies of member countries.

Figuring in this system is the production of enough animal products to insure good supplementation with the essential nutrients provided by milk, eggs, fish meal, and meat.

The deficient patterns of various foods, Allison explained, can be corrected in whole or in part by mutual supplementation, a corrective process that is adequate in the average mixed diet in the United States.

Addition of soybean meal to cornmeal, for example, helps correct deficiencies of the amino acids lysine and tryptophan in cornmeal. Sesame seed will improve the sulfur amino acids and increase the tryptophan further. A mixture of whole wheat and milk develops a pattern of amino acids of high nutritive value. People themselves have learned to a certain extent to supplement deficient plant food, as in succotash, he said.

Allison described the structure and functions of dietary proteins and discussed some of the newest concepts of protein synthesis. In brief, the dietary proteins supply amino acids for cellular protein synthesis and for other special metabolic purposes. Forming the pro-

tein compound are some 22 different amino acids arranged in order along a polypeptide chain.

It has been found that not all of the 22 amino acids need to be supplied by the diet although they are all required by the body, and their inclusion in the diet may relieve the body of the stresses of synthesis.

The amino acid glycine, for example, can supply the material for synthesis of all but eight in sufficient quantities to maintain nitrogen equilibrium in adult man.

The eight amino acids essential for maintenance of nitrogen equilibrium in man are isoleucine, leucine, lysine, methionine, phenylalanine, threonine, tryptophan, and valine. Possibly arginine and histidine should be added for the growth of the infant.

But in the complex story of protein synthesis the pattern of protein intake is also important. The essential amino acids must be arranged in their proper places on the protein catalyst. If any acid is missing, a break in the chain occurs and cellular protein cannot be formed. A low concentration of an essential amino acid also limits synthesis.

Increased intake of a food deficient in essential amino acids, such as wheat gluten, can help correct the deficiency, but too great an increase of the deficient food may result in an excess of the other amino acids and excretion of waste nitrogen. It may also create an imbalance between nitrogen and caloric intakes, a type of imbalance commonly found in many areas of the world where low protein, high carbohydrate foods are basic to the diet.

If the dietary protein supplies the essential amino acids in a pattern appropriate for synthesis and other needs of the body, the intake can be relatively low, Allison said.

He cited the need for analyzing the dietary protein sources of the world to determine the amino acid patterns available to various peoples and for determining the ideal dietary pattern for use in evaluating these protein sources.

Maternal and Child Health . . .

Factors Causing Mongolism Differ With Maternal Age

The factors causing mongolism in the progeny of older women are quite different from the factors productive of the disease in the offspring of younger women, stated Drs. Theodore H. Ingalls, Joan G. Babbott, and F. Randolf Philbrook, Harvard University School of Public Health.

They drew this conclusion from their study of two age groups, under 34 years and 34 years or over, of mothers of mongoloid babies and controls matched for age.

Few of the younger mothers of mongoloid babies, Ingalls reported, experienced vaginal bleeding during the pregnancy (1 of 21) whereas a high percentage had retroversion of the uterus (9 of 21). Among the controls in this age group, 4 had vaginal bleeding, but only 3 had retroversion of the uterus.

Among the older women, vaginal bleeding was much more common in mothers of mongoloid babies than in their controls (9 as compared with 1 of 31), while retroversion of the uterus was equally common in each group (9 of 31).

Speculating on the significance of these findings, Ingalls observed that "retroversion might result in a temporary compression-stagnation effect if the gravid uterus gets trapped under the sacrum at the end of the second month of pregnancy just before it is due to enlarge upward into the pelvic brim." He believes the subject deserves intensive study.

The present study confirmed the fact that older women are more prone to bear mongoloid children than younger women, a fact that implies that chronic, rather than acute, processes may be causative factors, Ingalls declared. Moreover, he said, a definite excess of chronic conditions, especially among the older mothers, was found in the mothers of mongoloid babies as compared with their controls.

Another finding of significance, according to the report, was that the mothers of mongoloid babies, both the younger and the older ones, had had more miscarriages or stillbirths than their controls.

On the basis of this study and others, Ingalls concluded that "mongolism has a multiple etiology from nonspecific acute and chronic stresses that are additive and active in the first trimester of pregnancy."

Indicates Way to Control Nursery Outbreaks

Since 1954, there has been a rising incidence of epidemics of staphylococcal infections among the newborn in hospital nurseries, caused by a penicillin-resistant strain of *Staphylococcus pyogenes*, according to a study conducted at the Ohio State University.

Reporting the following findings on 19 outbreaks in United States nurseries were Drs. Thomas E. Shaffer, Robert F. Sylvester, Jr., Jack N. Baldwin, and Melvin S. Rheins.

In identifying the epidemic strain, bacteriophage typing and determining the pattern of antibiotic sensitivity proved to be valuable techniques.

The principal manifestation of infection was the pustular skin lesion among infants. Breast abscesses among nursing mothers, and in some cases among the infants themselves, were observed. Fatal infections have been reported.

Nasal carriage of the virulent strain preceded clinical infection.

Despite the great gains that have helped infants to survive their first year, gains especially notable among nonwhites, marked differences still appear in infant mortality rates of the respective States. *(PHM chart)*

To control the outbreaks, it was necessary to inhibit nasal colonization. Prophylactic use of the appropriate antibiotics proved effective after ordinary measures such as isolation of those infected and hexachlorophene bathing had failed.

A disturbing feature of these epidemics was the development of infection in most cases after discharge from the hospital. The field of contagion was thus widened through contact in the home, where the organism had a persistent extensive effect. At the same time, hospital staffs were probably not immediately aware of the epidemic situation and physicians and public health personnel treating infected persons in the community had no reason to suspect the nursery as an infection source.

The most important step towards control of these epidemics is to make all staphylococcal infections in very young infants and breast abscesses in nursing mothers reportable diseases, they concluded, pointing out that local health officers would then be able to warn hospital administrators about the suspected nursery infections.

Child Loss Suggests Priority In Maternal Health Service

Fetal and neonatal deaths are concentrated among the offspring of relatively small groups of women, according to Dr. Edward R. Schlesinger and Norman C. Allaway of the New York State Department of Health.

Results of a study of single births in upstate New York in 1951 suggest a need for concentrating maternal health services in these groups of mothers, Schlesinger said. The study, the first to classify risks according to the combined factors of age of mother, number of previous children born, and number of previous children lost, showed that 18 percent of the perinatal deaths occurred in a category with 8 percent of the deliveries.

Analysis of perinatal death rates for the offspring of mothers in each

Age of mother	*Previous children born*	*Previous children lost*
Any age	1	1
Do	Any number	2 or more.
40 and over		
25 and over	2 or 3	1
30	5 or more	1 or more.
20–24	do	0
35 and over	0	

5-year age group, according to number of previous children born and number lost, showed the greatest risk of perinatal loss among the groups in the above table.

The highest perinatal mortality rates were found among women 25 years of age and older who had lost four or more previous children. Women with one previous child had the lowest perinatal mortality rate for all age groups, and the lowest rate among these mothers was among those aged 25–29.

Priority of maternal health services for those in susceptible groups should reduce perinatal mortality more than services with no system of priorities, Schlesinger concluded.

Recommends Rubella Before Pregnancy

The consequences of maternal infection from german measles (rubella) should be anticipated by immunization, in preference to coping belatedly with them by use of gamma globulin or other measures, according to Dr. Theodore H. Ingalls, Harvard University School of Public Health. The consequences of rubella are statistically negligible in children and adults, but they are large and often tragic for the embryo, he said.

Clinical observations in Australia showed that a rubella epidemic, 1939–40, left a series of pathological consequences for the unborn babies: congenital cataract, deafness, mental retardation, and heart disease. American and European reports subsequently confirmed these observations.

Although the clinical observations definitely established that rubella in the first trimester of pregnancy frequently proves teratogenic for the fetus, the numerical risk of maternal infection was not established. To evaluate the risk, Ingalls said, the normal as well as the abnormal outcome of pregnancies complicated by rubella must be known.

Rubella cases reported in Massachusetts since 1917 indicate long-term fluctuations of spread in addition to seasonal variations. An approximate 7-year rhythm is discernible with about three of the annual cycles often approaching a peak and the next few usually receding from it. Three of the four largest outbreaks occurred during times of war.

Since inability to measure epidemiologically the impact of rubella on the embryo has been due to technical difficulties in case finding and case reporting, demonstration of teratogenicity has been limited to clinical evidence.

The challenge now, said Ingalls, is to capture the virus and dispense it in a manner similar to the vaccinia. A practical step would be to allow women who have never had rubella to become actively immunized before marriage or pregnancy, especially in times of epidemic. Although it is conceivable, he felt that an elaborate plan of immunization comparable to that against poliomyelitis seems neither necessary nor feasible. A simpler method, he suggested, would be to have the disease—naturally or artificially.

Pediatricians, physicians, and school nurses should encourage the acceptance of developing rubella naturally and the resulting immunity with the same seriousness with which they urge immunization against tetanus. With regard to artificially acquired rubella, Ingalls pointed out that until the adult population is more highly immune than at present, there is a slight risk that school children will bring the infection home to a susceptible but pregnant mother. But, there is reason to believe that the gains would quickly outdistance the losses, he concluded.

School Health . . .

New York City Evaluates School Nursing Activities

Several suggestions for freeing the nurse from clerical and other nonnursing routines were embodied in the report of a survey of public health nursing activities in school, made by the New York City Health Department. The report was presented by Grace M. McFadden and Helen A. Miller, public health nurse consultants, and Marguerite P. Chapman and Florence R. Rich, statisticians.

The school health services in New York City have expanded greatly since 1940. Accompanying this expansion has been a decrease in the size of staff. In 1955 the bureau of public health nursing undertook to learn how nurses could use their time in school to best advantage. First, it was necessary to learn how the average nurse spends her time in school. To do this, nursing service in a sample of 115 elementary and junior high schools, both public and parochial, was studied.

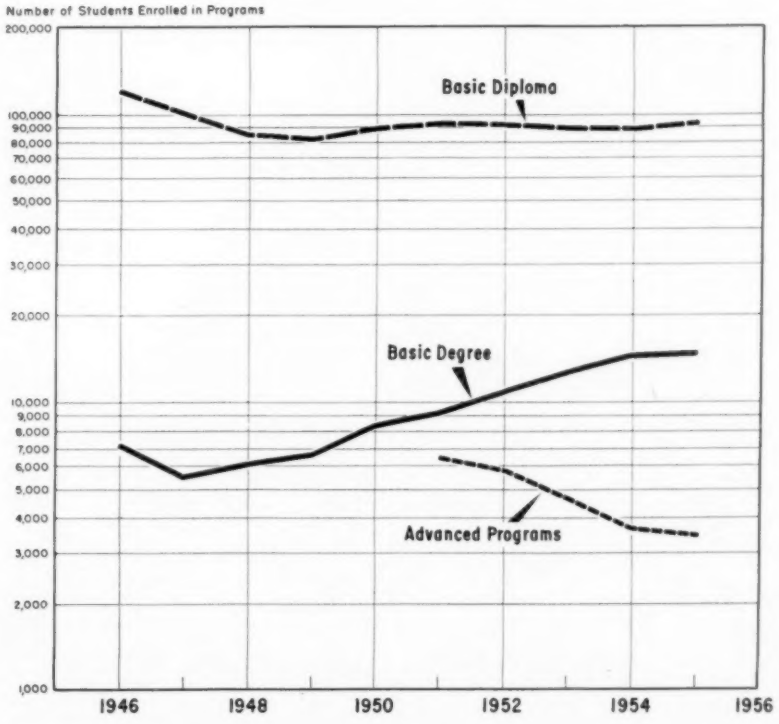
The nurse spends approximately 73 percent of her time in nursing activities, 25 percent in non-nursing ones, and the remainder in such events as civil defense and fire drills. Of 21 duties broadly classified, only

13 require her professional judgment and a background of public health nursing. These range from daily inspections to 7 types of conferences, including teacher, parent, and doctor. She uses about 28 percent of her time in case-finding activities and 30 percent in followups which are included in the 13 broad classifications.

Public health assistants are a recent addition to the school health service. Under the nurses' supervision they perform clerical and semitechnical duties. The findings suggest that these public health assistants should continue to be assigned to the school, but on a regularly scheduled basis, not on an occasional basis, and at a ratio of at least 20 percent of the nurses' time.

Where this ancillary help was available, the report stated, nurses were able to increase time spent in nursing functions by 7 percent. However, nurses still continued to perform non-nursing activities when public health assistants were in the school. Obviously, clerical duties are assignable, but the survey suggested that there is need for better orientation of nurses in the ways of working with such help. Emphasis should be placed on the type of work which nurses can delegate while still maintaining overall responsibility. It also suggested a qualitative review of all nursing activities in school to determine whether more might be shared with other school personnel or assigned to ancillary help. This should lead to a more discriminating use of nursing time for work which unquestionably should be done by nurses.

Trend in Nursing Students



In 1955, nursing students working for a basic degree comprised 14 percent of the total number (108,000) enrolled in State-approved schools, nearly three times the percentage in 1946. Total enrollment had not increased, however. Enrollees in advanced programs had declined by nearly 50 percent since 1951. *(PHM chart)*

Nurse Aide Program Proves Popular

The use of nurse aides in school health clinics has the enthusiastic endorsement of Margaret A. Bauer, nursing supervisor in the Arlington County, Va., public school system.

Evolving from the need to give school nurses some assistance with record details, the Arlington program was initiated with a student aide program in one of the senior high schools in 1951 and the employment of an adult assistant in one of the high school clinics in 1952.

Since then, three other paid workers have been assigned full time to a junior or senior high school, and the student program has spread to all but two of the secondary schools.

The student program is popular with nurses, students, and parents, Bauer stated. It requires constant supervision, however, and for that reason may not be feasible under some circumstances, she added.

To qualify as an adult assistant, a person must have successfully completed high school and standard Red Cross courses in first aid and care of the sick. Past experience in working with teen-agers and active participation with the Boy Scouts and 4–H clubs plus maturity, warmth, and understanding of adolescence are desirable qualifications also.

Registered nurses are not hired as adult assistants. The adult aide is trained on the job by the professional nurse. Her general duties include first aid, administering to the ill, reporting to parents, keeping the clinic log, assisting in screening procedures, recording test data on health records, and taking charge of supplies and linens.

The Arlington program has reaped the advantages of freeing the nurse from handling approximately 30 student visits daily, of eliminating

housekeeping chores from her schedule, and of keeping the clinic open in her absence. The aide is in a position to control interruptions when the nurse is talking to a parent, working with a pupil, or in conference with other members of the professional team, Bauer explained.

There are no disadvantages to the program if the aide has been selected wisely, Bauer assured. An aggressive person, she pointed out, may rebel against the constant supervision of the school nurse, and the timid soul sometimes lacks confidence.

Student aides work directly under the nurse aide. Both boys and girls are eligible. As they become trained, they carry out many of the functions of the adult assistant. The chief exception is that students are never permitted to handle confidential nursing records.

Student aides in junior high receive credit for each school year of experience. They are graded on factual knowledge and performance, and the grade is recorded on regular report cards.

Senior high students receive points toward an honor card or a school activity letter. The clinic period is arranged to coincide with study hall periods. Only boys and girls with average or better intelligence and performance are eligible. Problem students are paired with stable and mature students. Boys are never paired with boys.

The student program, Bauer noted, gives the youngsters valuable experience in the basic techniques of caring for the sick, an opportunity to assess their personal aptitudes for future vocations, and a maturing experience that will carry over into adulthood. Along with the practice of first aid, she said, they learn the rudiments of professional behavior and poise in the presence of illness and accidents.

This experience in a clinic setting has already been instrumental in recruiting future nurses from among the girls, Bauer reported. A number have formed the nucleus of a future nurses' club. Though it is not known how many have entered nursing or the allied medical professions, she knows of at least five who have entered nursing training within the past 2 years.

"We like to think the student aide experience was a factor in choosing this profession," she said.

Dental Health . . .

Philadelphia Plans Dentistry For Homebound Patients

Provision of dental care to homebound and institutionalized patients was recommended by Dr. J. M. Wisan, chief of the section on dental health, Philadelphia Department of Public Health.

Wisan said that the Council on Dental Health of the Philadelphia County Dental Society plans to appoint a committee made up of dentists, physicians, a psychiatrist, a nurse, social workers, and other health and welfare personnel to study the dental needs of nonambulatory patients.

Suggestions have been made that this committee also train dentists to use specialized equipment and techniques for treating these patients, obtain the portable equipment necessary to treat bedbound and wheelchair patients, and formulate and implement a treatment program for them. Details of the proposed program follow.

Study of Dental Needs

In collaboration with private practitioners, we expect to assign a dentist to examine 73 homebound patients who are on the home care program of the northern division of the Albert Einstein Medical Center and 45 persons on the "meal and wheel project." This survey will provide answers to the following questions: When was dental treatment last provided? Are routine dental examinations required by this group? What types of dental treatment are required? How much dental care is needed? How well do the patients carry out dental hygiene practices?

Professional Training

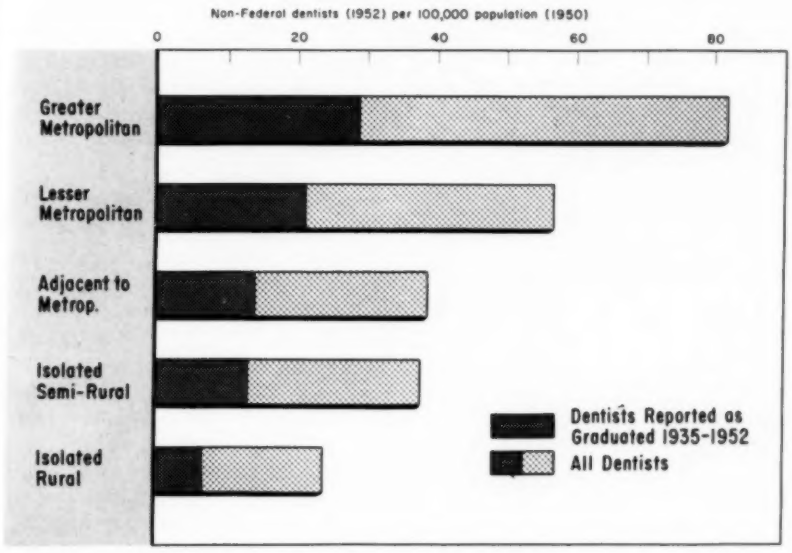
Since specialized equipment and unique techniques are needed for treating chairbound or bedbound patients, participating dentists should be taught how to treat the chronically ill. Health departments and dental schools can offer courses of training similar to those offered in the fields of oral cancer and treatment of handicapped children. Hospitals can sponsor teaching programs. Discussions of technical procedures will be necessary, and it will also be useful to study attitudes of patients and the psychological approaches required for treating chronically ill patients.

Perhaps the dental school will assign senior dental students to assist in this program so that they may obtain experience in treating homebound patients.

Equipment

Some hospital dentists have constructed ingenious devices for providing dental care for bedbound patients. For example, a dressing cart has been rebuilt into a dental bedside unit, with an attached dental engine, a spotlight, a basin, and a shelf for instruments and medicines. A portable engine and light may be used for homebound patients, and some will require a portable X-ray unit. The women's auxiliary of the dental society is raising funds for the necessary equipment. Transportation for this equipment must be arranged.

Urban-Rural Differences in Dentist Supply



Metropolitan areas in 1952 had nearly 3 times as many dentists per 100,000 population as rural areas. In all areas, about one-third of the dentists had graduated since 1935. (*PHM chart*)

Treatment Program

Provision for treating hospitalized, institutionalized, and homebound patients must be included in a treatment program for the chronically ill, and some hospitals have the necessary personnel and equipment to perform this task. Our plans, therefore, will be concentrated on smaller hospitals and institutions lacking dental clinics and on home treatment programs. Administrators of larger hospitals will be asked to consider the desirability and feasibility of sending dental interns and residents to homes of patients requiring treatment.

Patients

Patients unable to pay private dentists should be given priority under the program, although persons whose dentists cannot provide home treatment should be included on a fee basis. The proportion of chronically ill persons who are unable to pay for dental treatment will undoubtedly be high for two reasons: The expense of long-term illness is crushing to most people, and the expense of providing dental treatment at home is greater than the expense of providing treatment in clinics and dental offices.

Dental Services

In well-equipped hospitals, dentists can furnish all treatment necessary for the systemic and oral health of a patient. However, in spite of the difficulties of bringing equipment into hospitals, homes, and institutions, adequate treatment should be offered patients who cannot visit the dentist. For the bedbound patient, adequate treatment would include relief of pain, removal of unsavable infected teeth, treatment and filling of carious teeth, treatment of periodontal diseases, replacement of missing teeth when necessary to maintain oral and systemic health, diagnosis and treatment of oral diseases, as well as therapeutic sedation and local and general anesthesia. When examing adults, particular attention should be given to precancerous conditions and early cancers.

Routine dental examinations at 90-day intervals for children and at 6-month intervals for adults are recommended. Because of the difficulty of treating bedbound patients, precautions that would reduce the backlog of dental defects would be advantageous. Experience indicates that regular examination and treatment do lessen the need for extensive dental care.

Pilot Program

One Philadelphia hospital plans to sponsor a pilot program of dental care for homebound and institutionalized patients, which it is hoped will lead to participation by other hospitals. Perhaps one mobile unit can be used by several hospital staffs. Staff dentists, interns, and residents may participate under the direction of their chiefs of dental service, and assignments can then be distributed so that the program will not prove burdensome for any one institution.

The health department, the Visiting Nurse Society, and other agencies interested in home medical services will be asked to help in the program. In the preliminary stages, financing will be sought from the Community Chest and from foundations. Plans for continued financing will be made later.

A register of chronically ill patients at home and in institutions is being set up by a subcommittee of the Health and Welfare Council. Hospitals have information concerning their bedbound patients, and the files of the Department of Public Assistance will be used for referrals.

Dentists interested and trained in treating bedbound chronically ill patients will be listed and assigned as needed.

Philadelphia Agencies Plan Dental Health Program

"Effective community coordination for dental health is . . . a joint action of professional groups and community agencies in developing and implementing policies and pro-

cedures for dental programs and in stimulating citizen participation to interpret policies and to attain public support through democratic processes." So stated Dr. J. M. Wisan, chief, dental health section, Philadelphia Department of Public Health, in opening the panel discussion on community planning of a dental health program.

Wisan suggested eight criteria for appraising community coordination:

1. Organization of a coordinating dental health committee by the agency sponsoring the dental program.

2. Assignment of definite responsibilities to members of the coordinating committee.

3. Designation of professional standards for the program by the dental society through its council on dental health.

4. Determination by the dental health committee of rules for accepting patients, types of locations of clinics, standards of treatment, measures to provide an adequate flow of patients, and dental health education measures.

5. Organization of local, district, and neighborhood committees to stimulate citizen participation in large cities.

6. Agreement of administrators of community dental care programs on a plan of reporting regularly to the coordinating committee: number of persons receiving treatment, number of visits by patients, number of teeth filled and type of fillings, numbers of permanent and deciduous teeth extracted, number of other treatments provided, fees charged per visit or per operation, rules for eligibility of patients, and number of dentist-hours spent in treatment.

7. Participation by the coordinating committee in evaluation and redirection of the dental program.

8. Invitations by the dental health committee to key persons in the community to help organize and attend conferences for discussion and improvement of existing dental programs.

Other participants in the discussions were Drs. Abram Cohen, supervisor of dental services, Board of Public Education; John P. Looby, dental supervisor, Philadelphia parochial schools; Albert L. Borish, chairman, Council on Dental Health, Philadelphia County Dental Society; and J. L. T. Appleton, professor of microbiology, University of Pennsylvania School of Dentistry.

Public Schools

An incremental dental care program for public school children has been carried on by the Philadelphia Department of Health since 1954, Cohen reported. In the beginning, treatment was restricted to 6-year-olds, although some teen-agers were treated when time permitted, and emergencies were handled. This year, he said, the accumulated needs of 8-year-olds and the maintenance needs of the 6- and 7-year-olds treated during the past 2 years will be taken care of.

Dental clinics are being established in school buildings, Cohen said, minimum standards of treatment have been compiled, and spot checking of completed dental work is carried on in school districts. School nurses are responsible for the flow of patients to the dental clinics. Nurses bring eligible pupils to the clinic or arrange for a parent to bring them. Nurses also see that clinic time is used to treat older children if the number of 5- and 7-year-olds is insufficient.

The board of education has endeavored to eliminate the sale of sweets by private vendors in school cafeterias and school yards and to encourage the pupils to eat fresh fruit instead. Fruits purchased by school principals through wholesalers are delivered to the school. Visual aids are used to promote the program.

This project, plus Philadelphia's fluoridated water supply, "will do more to increase the percentage of caries-free teeth than any other aspect of dental health education," Cohen stated.

Parochial Schools

In Philadelphia's parochial schools, a program of periodic dental examinations, sponsored by the State health department, was begun in 1946, Looby stated, and from the beginning the program has been integrated with the county dental society's council on dental health.

Projects to promote dental health in the parochial schools have included an annual poster contest, assembly programs and distribution of educational materials, sale of toothbrushes at a reduced rate, membership in the coordinating committee of the Philadelphia County Dental Society, cooperation of the nursing corps of the schools in the selection of children for clinic treatment, installation of dental clinics in 5 schools and 1 settlement house, establishment of an escort service for the children, and coordination of efforts to obtain dental care in three hospitals.

The key group in coordinating the efforts of all agencies has been the council on dental health of the Philadelphia County Dental Society, Looby said, and membership in that group has made possible expansion of a program which provides the best care for parochial school pupils within the framework of organized dentistry.

County Dental Society

Reporting on the work of the Philadelphia County Dental Society's Council on Dental Health, Borish said that the council's efforts had resulted in "a true community approach to community dental health problems." The council, he stated, has six objectives:

1. To have all agencies with dental programs represented on the council, with voting privileges.

2. To have all policies approved by the board of governors of the county society.

3. To be the informational center for community dental needs and resources.

4. To help coordinate all community dental programs so that they will perform the maximum service.

5. To help each agency obtain community support.

6. To help evaluate programs and induce improvements.

The revised Standards for Dental Procedures for the Child has been sent to all public and private dental agencies in Philadelphia, Borish stated, and has been published in local and State journals.

The subcommittee on dental agency administrators has made plans to standardize programs and records, he said, and refresher courses have been offered by and for hospital staff dentists.

Finally, through work conferences, community groups have come to recognize the objectives of the dental health program and are cooperating in achieving them, Borish concluded.

Health and Welfare Council

Concerning the role played by the Health and Welfare Council in promoting community dental health, Appleton stated that one of the council's most important functions is "to encourage, and to participate in, the processes of effective coordination."

The council has sponsored or cosponsored dental surveys, studies, and conferences and is reviewing the resources available or required to meet dental health needs in Philadelphia.

Reviewing the panel discussions, Appleton said that the criteria for appraising community coordination are realistic, that organized dentistry in Philadelphia is socially alert and responsible, that school dental programs are effective, and that the trend toward installation of public health dental clinics in school buildings is most promising.

In conclusion, he said that real progress has been made toward effective cooperation but that it would "be naive to claim that coordination is now 100 percent efficient, or ever will be." Coordination, he stated, is "a never-ending process, adapting to . . . the ever-changing constellations of new personalities, conditions, and experiences."

Chronic Illness Surveys To Include Dental Exam

Studies in Virginia to determine the extent and nature of the chronic illness problem will include a complete dental examination, according to Dr. David R. Wallace of the Virginia State Department of Health.

These studies, to be carried out by the State through local health departments, will ascertain the number of chronically ill and, in each case, the diagnosis, mobility status, need for medical care, and possibilities of rehabilitation. Only when such information is available can communities plan adequately to cope with chronic illness, Wallace stated.

Provision of dental care for the chronically ill often will take the dentist away from his private office, to a private home, a nursing home, a health center clinic, or a hospital, Wallace pointed out. The patients confined to their homes, he indicated, will present the greatest problem.

To illustrate the difficulties in providing a complete dental service for the chronically ill, Wallace mentioned problems associated with a few of the chronic diseases. In mental illness, he said, general anesthesia often must be used. In epilepsy, the dentist must avoid using removable bridges or dentures. When performing dental operations on patients with cardiac disease, special precautions must be taken.

Dental schools must train their students to cope with the dental problems of the chronically ill, Wallace advised. This might be done by giving students the opportunity of working with patients in hospitals and nursing homes. Special emphasis, he said, should be placed on such oral conditions as gingivitis, advanced periodontal disease, Vincent's infection, and recognition of the oral manifestations of such systemic diseases as tuberculosis, Addison's disease, nutritional disorders, diabetes mellitus, and oral cancer.

Wallace also recommended that the dental student become acquainted with the procedures of multiphasic screening. This will enable him, he said, to share effectively in such a survey in his community.

New Apparatus Designed For Fluoride Recording

Two systems for continuous recording of the total fluoride content of a water supply were described by F. J. Maier and Ervin Bellack, who are with the Division of Dental Public Health, Public Health Service.

One newly designed apparatus combines double distillation with conductivity measurement. This apparatus isolates the fluoride ion from other interfering ions, Maier said.

A continuous record of the fluoride content, Maier explained, will not only serve as an indication of the operation of the fluoride-feeding system, but will provide a graphic history of the fluoride concentration at any previous time. Also, the recorder can be used as the primary device for actuating the fluoride-feeding mechanism, he stated.

The double-distillation apparatus is a further development of the single-distillation device described by R. E. Frazier and H. G. Oldfield of the Minnesota Department of Health. Their device, Maier said, gives a distillate satisfactory for direct chemical analysis of fluorides, but not for conductivity measurements.

With the double-distillation assembly, only those ions that distill over from the sulfuric acid used in the first still (chloride of nitrate, for example) are likely to contribute errors to the conductivity measurements. However, Maier pointed out, these may accumulate for some time in the second still before they appear in the final distillate. Thus, accurate determinations can be obtained by cleaning the apparatus and replacing the acid at appropriate intervals.

Except for daily changing of the

chart on which the conductivity is recorded and occasional replenishing of the ink used in the recorder, the unit may be allowed to operate continuously without attention for as long as the accumulation of ions in the first still will permit, Maier stated. For water containing relatively small amounts of dissolved solids, this may be as long as a month.

Rapid Colorimetric Method

The second apparatus Maier described combines continuous distillation with the rapid colorimetric method for measuring fluorides. The design of this apparatus provides for continuous metering of the water sample and two reagents, the mixing of the three ingredients, and the passing of the mixture through an absorption cell in a photometric device. A recorder, graduated in fluoride units, is connected to the photometer.

Incoming water, Maier said, can be distilled automatically and continuously by the apparatus described above. However, only one distillation is necessary because of the tolerance of the eriochrome cyanine R reagent to most interferences, he added.

Fluoridation in Grand Rapids Benefits Older Children

According to the results of the annual dental examinations in Grand Rapids, Mich., fluoridation has benefited not only children born since fluoridation was begun but also those born before, reported Dr. Francis A. Arnold, Jr., director of the National Institute of Dental Research, Public Health Service.

For 16-year olds, for example, the DMF rate decreased 26 percent between 1944 (the year before fluoridation was started) and 1954, he said. For children drinking fluoridated water continuously since birth, the percentage decrease ranged from 50 to 75 (see table).

The 1955 examinations of children aged 11 through 16 years indicated that the beneficial effects of fluoridation continued on through the 11th year of fluoridation, Arnold added. Further reductions in the DMF rate were observed among children of each age.

At the same time, fluoridation in Grand Rapids has not produced a significant degree of dental fluorosis, Arnold pointed out. For 11-year olds, only 4 percent had even "very mild" fluorosis in 1955. None had a higher degree, and 89 percent were "normal."

This study, like many others, has demonstrated the certainty of fluoridation as a public health procedure for improving dental health of a community, he asserted. Moreover, he said, in none of the studies has there been any scientific evidence to suggest an adverse effect on other biological systems of the body.

Fluoridated Water Inhibits Caries in Erupted Teeth

A study of children in Grand Rapids and Muskegon, Mich., indicates that artificially fluoridated drinking water inhibits caries in teeth already erupted. The protective effect on teeth in the pre-eruptive stage has been established in earlier studies.

Although the protection given erupted teeth of a single individual is small, the total effect on a large number of people may have public health significance, stated Dr. Richard L. Hayes, Dr. Norman Littleton, and Carl L. White, of the National Institute of Dental Research, Public Health Service.

Between 1944–45 and 1956, Grand Rapids children experienced fewer and smaller cavities in approximal surfaces of first permanent molars than did Muskegon children, Hayes reported. The Grand Rapids children, he explained, had drunk fluoridated water since 1945, but the Muskegon children, only since 1951.

All the children studied had two or more first permanent molars in 1944–45 and were continuous residents of their respective cities. The two major study groups, each composed of 116 children, were matched for caries susceptibility on the basis of the 1944–45 examinations.

For statistical analysis, a system for scoring caries according to size or depth of the cavity or filling was used, Hayes stated.

On clinical examination, the size

Percentage decrease in caries rates after 10 years of fluoridation in Grand Rapids, Mich.

Age (last birthday)	Number children examined		Percentage reduction in caries rate	
	1944	1954	def	DMF
6	1, 789	561	54	75
7	1, 806	751	48	63
8	1, 647	567	43	57
9	1, 639	477	35	50
10	1, 626	515	17	52
11	1, 556	499	2	54
12	1, 685	260	.....	52
13	1, 668	224	.....	48
14	1, 690	250	.....	38
15	1, 511	240	.....	35
16	1, 107	198	.....	26

Mean caries scores for approximal surfaces of first permanent molars, matched groups of children in Grand Rapids and Muskegon, Mich.

Examination	Grand Rapids	Muskegon	Difference
Clinical	0. 83	1. 22	0. 39±0. 11
X-ray	1. 73	1. 99	. 26± . 12
Clinical plus X-ray	1. 74	2. 02	. 28± . 12

of the cavity or filling was recorded as small, medium, large, or "pulp exposure" and scored from 1 to 4. On X-ray examination, the depth was recorded as enamel only, or shallow, moderate, or deep dentin and scored similarly. A missing surface was scored 4. For each individual, the scores were totaled and divided by the number of surfaces at risk to give a "caries score."

The difference between the two groups of children in caries experience of approximal surfaces was evident from the clinical examination alone, from the X-ray examination alone, and from the two examinations combined (see table).

The difference in the mean caries scores for the buccal plus lingual surfaces, Hayes said, was about the same as the difference for the approximal surfaces. He considers this finding "curious" since the caries susceptibility of the two types of surfaces is very different.

The mean caries scores for occlusal surfaces was also lower for the Grand Rapids children than for the Muskegon children, although the number of decayed or filled occlusal surfaces was the same in the two cities, Hayes observed.

Periodontium Not Injured By Use of Fluoride Water

The use of fluoride-bearing water does not adversely affect the prevalence or severity of periodontal disease in children or adults, according to examinations of more than 20,000 persons, reported Dr. Albert L. Russell of the National Institute of Dental Research, Public Health Service.

In each of three comparisons between a group drinking fluoride-bearing water and a group drinking fluoride-free (or essentially free) water, the fluoride group exhibited the more favorable periodontal condition on direct examination, Russell said. Also, extractions because of periodontal disease were somewhat less frequent among adults in the fluoride communities.

One of the comparisons was between 144 adults aged 20–44 in Colorado Springs (2.5 p.p.m. F) and 379 adults in the same age group in Boulder (fluoride free), Colo. In Colorado Springs, 52.8 percent were free of periodontal disease as compared with only 38 percent in Boulder. Once it occurred, however, the disease was equally severe in the two communities, Russell said.

For older adults, a comparison was made between residents of Bartlett (8.0 p.p.m. F) and residents of Cameron (0.4 p.p.m. F), Tex.; for children, between residents of Newburgh (1.0 p.p.m. F) and residents of Kingston (fluoride free), N. Y. The results were similar to those for Colorado Springs and Boulder.

Study of the question was also afforded by examinations of some 18,000 native and migrant children in communities using water containing about 1.0 p.p.m. F, according to Russell. Comparison of the native children with the migrants, he said, revealed no adverse effect of the fluoride water on periodontal health. In fact, there was a weak tendency for improved periodontal health among the native children with an increase in the length of time they had drunk fluoridated water.

The findings are "wholly incompatible with any hypothesis that the periodontal tissues of children or adults are harmed by use of a fluoride-bearing water," Russell concluded. However, he pointed out, they are not adequate to support a hypothesis that fluoride water results in improved health of periodontal tissues.

Safety . . .

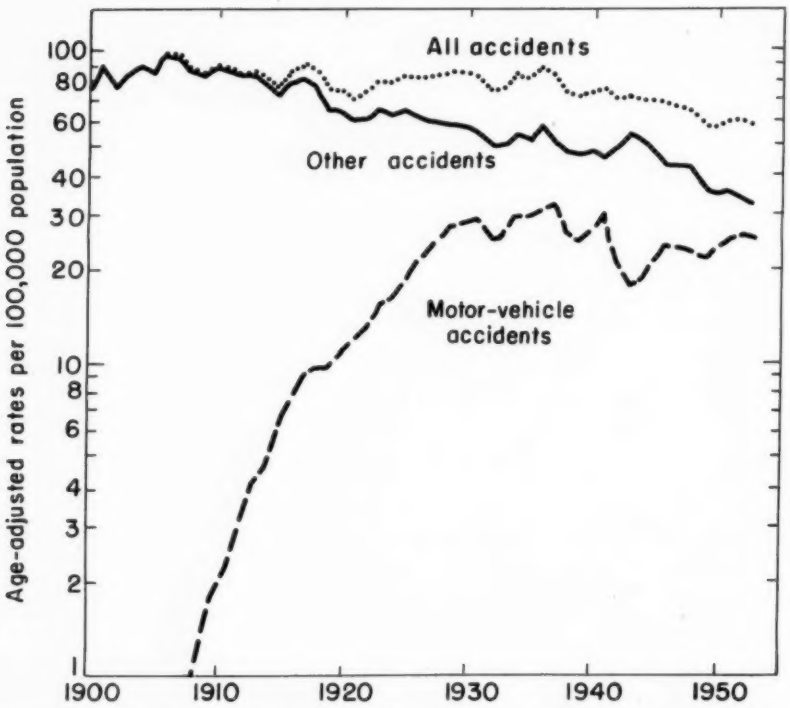
Farm and Home Safety Needs New Approach

To emphasize the need for farm and home safety programs, Dr. Charles M. Cameron, Jr., acting chief of accident prevention for the North Carolina State Board of Health, pointed out that in the past 5 years more than 100,000 Americans have lost their lives in their homes. Farming as an occupation, he said, ranks first in number of deaths from accidents.

Although a great number of safety programs have been initiated in the past few years, recent surveys indicate that there is a need for still greater awareness on the part of public health workers that accidents are a crucial health problem. An inventory made by the National Safety Council in 1955 listed 591 agencies that had carried out some type of home safety activity in the previous year. Public health agencies were far outnumbered by farm groups, women's clubs, safety councils, and other organizations.

More safety education on a face-to-face basis is needed, Cameron as-

Death Rates for Accidents



Were it not for motor-vehicle accidents, rates of death from accidents per 100,000 population could have shown a marked decline since 1910. Motor-vehicle accident death rates, about 24 deaths per 100,000 population in 1953, declined from an average of 8.9 deaths per 100 million miles in 1938–42 to 4.5 in 1953. (*PHM chart*)

serted, suggesting that this process is especially suitable for public health workers, who have gained an intimate understanding of the individual and his family.

Traditional safety activities, according to Cameron, have included short-term campaigns, safety drives, and promotional programs utilizing the media of public information—pamphlets, booklets, posters, newspaper articles, radio spot announcements, and safety proclamations.

Has anyone attempted to determine just which of these efforts actually do change human behavior toward safer living? he asked.

Admittedly, he said, it might not have been wise to delay public health safety programs until we could answer this question, but certainly every effort should be made to answer it as soon as possible.

Greater cooperation by administrators, public health nurses, sanitarians, and health educators is another need in accident prevention work, according to Cameron. It was apparent early that all public health disciplines would be essential if accidents were to be attacked successfully, and many local health departments initiated accident control activities on that basis, he said. However, in some departments, home safety is considered a nursing activity or the exclusive responsibility of the health educators. The labeling of any program as the distinctive property of a single discipline does not, he concluded, stimulate interest among the others.

Failure to utilize fully all community safety resources has further hamstrung many health department accident prevention programs, Cameron said. Industrial safety programs, community safety councils, municipal fire departments, and agriculture extension programs have been repeatedly cited as valuable allies in planning and conducting meaningful safety programs, yet the location and facilities of these are unknown to many public health workers.

The role of the local health department as impartial coordinator of all community safety interests he envisioned as another of the unique contributions public health can make to the safety movement.

Automobile Accidents Related to Mileage Driven

The more miles a person drives, the more likely he is to have an accident, according to a home interview study of 810 drivers in Schenectady, N. Y. This result from one phase of a research project on driver behavior and accidents was reported by Dr. Jean K. Boek, Russell Sage College, Albany, N. Y.

Another finding was that men tend to have more accidents than women, even when the factor of exposure (number of miles driven) is held constant. In fact, Boek said, the percentage of men in the low exposure group who had accidents was higher than the percentage of women in the high exposure group.

Age, weight, schooling, usual speed on the open road, drinking, and smoking were other characteristics on which Boek reported. She compared drivers who had no accidents, those who had accidents for which they were responsible, and those who had accidents for which they were not responsible.

In another phase of the project, Boek said, no relation was found between "unsafe" driving and being in accidents, nor were there any significant age or sex differences in driving behavior. In this part of the study, which covered 550 drivers, nine driving acts, such as stopping and turning, were observed without

the drivers knowing it and scored "safe" or "unsafe."

This research, Boek concluded, indicates the importance of giving careful attention to measurement of exposure to accidents, of studying men and women drivers separately, and of studying a random sample of drivers in their communities so that variables may be observed as they actually operate.

Support Driver Education Health Officials Asked

A five-point program to improve the behavior of automobile drivers was proposed by Dr. Herbert J. Stack, director of the center for safety education, New York University. Underlining the urgency of the problem, he asserted that bad driving practices caused about 80 percent of all traffic deaths last year.

Stack appealed to health authorities to ally themselves with the traffic education phase of the safety movement. "The accident prone could be thought of as sick drivers," he pointed out. State and local health departments, already cooperating with the home safety campaign, will make a valuable contribution by extending their interest to traffic safety education, he stated.

Accidents are caused chiefly by faulty attitudes and bad personality characteristics rather than by a lack of driving skill, he said. New York University studies show that social irresponsibility is the worst offender.

Experience has proved that improved, accelerated enforcement and a strengthened police force will reduce accidents, Stack said, but the gigantic task of effectively regulating 65 million drivers on our thousands of roads calls for more than police efforts.

He urged uniform motor-vehicle rules of the road, regulations, and driver's license laws, pointing out that many States issue driving licenses almost as freely as they do hunting permits. He commended the 14 States using the point system with a graduated scale of demerits. Stack also praised driver behavior clinics. License revocation and suspension are the most efficient sanctions in the driver improvement program, he said.

Traffic engineering undoubtedly contributes toward good road behavior. Devices such as medial strips on four-lane roads, channelizing traffic, and information and warning signs reduce human error substantially.

Strengthening the work of the traffic courts, according to Stack, is essential. Lack of uniformity and of trained magistrates, overcrowded sessions, and poor conduct of many courts foster a negative attitude toward traffic control.

Education

Stack pointed out that most drivers acquired their skills in commercial driving schools, or haphazardly from friends or relatives, with little direction in proper driving attitudes. However, the driver education movement in the Nation's high schools trained nearly 1 million students last year. The State of Michigan, moreover, will now require license applicants under 18 years old to have completed an approved course. Other States will soon follow, Stack believes.

Automobile dealers have cooperated by lending more than 6,000 cars without cost. Stack also mentioned the contribution of more than $200,000 from casualty insurance companies and oil firms for teacher scholarships, and the endorsement of the driver education program by well over 80 organizations.

Educating the mass of adult drivers, most of whom appear to be satisfied with their performance, constitutes the greatest challenge.

Environmental Health . . .

Food Poisoning Outbreaks Traced to Milk Powder

Spray-dried nonfat milk solids were implicated in a series of 19 outbreaks of acute gastroenteritis among Puerto Rican school children early in 1956.

Reporting the epidemiological work in tracing the source and agent were Dr. Rolando Armijo of the University of Puerto Rico School of Medicine, Dr. Rafael Timothee of the Puerto Rico Department of Health, and Dr. D. A. Henderson and H. B. Robinson, both of the Public Health Service.

The outbreaks, the first associated with spray-dried milk in the United States, occurred between January 23 and February 21 in 16 schools participating in the school lunch program. More than 775 children became ill.

Food histories of the school children suggested spray-dried milk as the responsible food. Confirmation was achieved by a human volunteer experiment.

Milk powder remaining in an opened can that was obtained the day following one of the outbreaks was reconstituted and given 13 adult volunteers by random selection. Nine of them developed gastroenteritis symptoms, five to a marked degree. Of the 13 controls given commercially purchased milk powder, only 2 developed mild symptoms.

Clinical symptomatology and the incubation period pointed to staphylococcal enterotoxin as the responsible agent. The principal symptoms were nausea, vomiting, abdominal pain, and diarrhea without fever, beginning from 1 to 5 hours following the noontime school lunch. There was virtually complete recovery within 24 hours.

The negative bacteriological results eliminated the staphylococcal organism itself. Toxicological tests

for metallic poisons were also negative.

That enterotoxin was present in the dried milk prior to reconstitution was adduced from the fact that the volunteers drank the milk almost immediately after it was made. And in none of the 16 schools was the reconstituted milk allowed to stand more than 5 hours before serving. In 9 of the schools the time interval was 3 hours or less.

Three lots of milk powder from 1 of the 8 processing plants involved were indicated as the responsible source of the outbreaks through a detailed epidemiological search, complicated by the lack of adequate identification on the individual cans. Bacteriological plate count records of samples from this plant were shown to be clearly out of line with those obtained from other plants.

Review Processing Criteria

The report emphasized the need for a careful review of the methods of processing and testing the milk and labeling packages in view of the substantial quantity of spray-dried milk produced and its worldwide distribution. The Puerto Rican school lunch program now uses some 4 million pounds a year.

Under the present testing procedures samples of all dried milk processed are submitted to the dairy inspection laboratory for plate analysis before release for distribution, the report related. But it pointed out that with only one test made for each 15,000 to 20,000 pounds of powder produced, a contaminated batch might escape detection. The testing lots are obtained by pooling 4 to 5 samples.

In suggesting consideration of the validity of the plate count itself, the report cited the plate count of but 30,000 colonies per gram for the milk used in the human volunteer experiment, a figure ordinarily certifying the milk as extra grade. It was pointed out that the heat to which the milk is subjected in the drying process might, in fact, reduce the bacterial flora to this level without destroying the enterotoxin.

Federal-State-Local Units Set Water Resources Policy

Forecasting growing demands on our water resources, Roy W. Morse, Department of the Interior, and staff member of the Presidential Advisory Committee on Water Resources Policy, reviewed recommendations of the committee to meet these demands.

In many parts of the western United States, the water supply has always been critical while in the more eastern part an ample supply has usually been taken for granted, Morse said. The New York City shortage in 1950 made many people aware of the dangers of a general water shortage situation.

Water Supply

Morse divided water supply into four major categories: public water supply, including domestic, commercial, and industrial use; self-supplied industrial use; steam electric power; and irrigation. These, he said, account for 98 percent of the total use.

Basic to the growing demand for water is the growth in population and the increased consumption per capita since World War II. Of the more than 200 million population predicted for 1975, approximately three-fourths will be served by public water supplies, Morse estimated. The daily water demand will rise from 17 billion gallons to an estimated 30 billion gallons. Further, it is estimated that $1 billion a year during the next two decades will be required to eliminate present deficiencies, offset obsolescence, and adequately serve the growing population.

Demand for self-supplied industrial water has grown faster than demand for public use, Morse told the engineers. New processes require increasing quantities of water, about 60 billion gallons a day at present.

By 1975, steam electric plants are expected to require 120 billion gallons a day, twice the volume of the present use, largely for cooling, Morse said.

Irrigation will require about 170 billion gallons per day by the same date. The usable return flow ranges from 20 to 60 percent, he said.

With adequate planning and with adequate acceptance of the many opportunities for increased water reuse, this future demand can be met. The greatest problems will be those resulting from unequal distribution of our national water resources.

Endorsing the objectives formulated by the Presidential Advisory Committee on Water Resources Policy, Morse said there are many approaches to the same end. Some would seek greater Federal authority while others fear Federal interference and dislike any assistance. The committee, he said, concluded that the desirable course lay between these two extremes. Thus, while it is desirable to have national policies where feasible, the committee believes water problems can be solved best in cooperation with the States and local interests. Sound procedure requires that all interested groups participate in planning from the beginning, Morse emphasized.

Recommendations

After reviewing the activities of the Federal agencies, their histories, and the laws under which they operate, Morse said the committee offered these recommendations:

1. More cooperation and coordination of water resources development among Federal agencies.
2. Adaptation of water resources policy to regional and local needs.
3. Sharing of financial responsibility for water development among Federal, State, and local governments, and private interests.
4. Equal contribution for equal benefits received.
5. Recognition of water rights as property rights in determining the disposition of water.
6. State control of pollution at the source; joint State action in solving interstate problems; and Federal research, investigation, and technical assistance.

The committee urged that the program of water quality evaluation be strengthened. Today there is no coordinated program for measuring biological quality, and there are only 220 stations throughout the country where daily samples for determination of chemical quality are taken, Morse reported.

Only in recent years, he said, has adequate attention been given to municipal and industrial water supplies or the provision of minimum stream-flow for pollution control. Individual cities and private companies have made their separate plans, often with little thought for the effect on other people, utilities, or industries. As a consequence, these features of multipurpose projects have not received the attention they deserve.

To meet the need for sound planning, the committee recommended the establishment of river basin committees including representatives of the Federal agencies and each affected State, with a nonvoting chairman appointed by the President; an office of coordinator of water resources in the Executive Office of the President; and an impartial board of review for evaluating the economic and engineering feasibility of projects before their submittal to the President.

The committee, Morse said, also recommended a study by the Federal Government in collaboration with the States to determine the relationship between the establishment of property rights to water and the economic and social development of the Nation. Such a study would clarify the rights of the respective parties, an essential to solving the current dilemma in this field.

San Francisco Intensifies Air Pollution Control

Determined to control present and future air pollution as the concentration of people and their activities increase, the San Francisco Bay area has embarked on a program of air pollution control that necessitates extensive integration with many types of government agencies at several levels—city, county, State, and Federal.

Designing the administrative and technical program for the first multicounty air pollution control district in the United States is the job of Benjamin Linsky, former smoke abatement officer for Detroit.

Linsky urged prompt action by communitywide cooperation. Fresh air has to be paid for in money and effort, he said.

In his talk to the Conference of Municipal Public Health Engineers, he opposed previous impressions that air pollution programs can be handled, like industrial hygiene, on a confidential relationship with employers only, or like water pollution control, where only a few agencies, industries, or home owners are directly responsible, or like traffic safety programs, where few drivers feel personally vulnerable.

Asked to explain why he believes administration of air pollution control differs from all other programs for public improvement, Linsky gave the following reasons.

1. The range of ownership of potentially polluting property is wide. It includes owners of factories, automobiles, homes, apartment homes, and of general commercial enterprises plus transportation companies, agriculturalists, scavengers, scrap and salvage processors, and government agencies.

2. The number of property and equipment items that emit pollutants directly to the atmosphere is about as large as the number of adults in the area. (This means 1 home plus 1 car for every 2 adults per family, modified downward by multiple dwellings and upward by governmental and commercial industrial operations and increased automobile duplication, he said.)

3. Many effects of excessive air pollutant concentrations are readily observed by large numbers of adults, who are directly affected in their person, property, or activity, but the subtle effects arouse their fears because they are not so readily detected.

4. The similarities of some of the technical measurement methods to those of other programs have led practitioners trained in other fields to conclude that the new administrative problems are solvable by the old familiar methods.

5. The many academic and scientific disciplines in air pollution control have not been welded into an accepted pattern of terminology, education, or training other than the "buddy" system, a combination of apprenticeship and internship.

6. The patterns of legislative design are not frozen for multiple community areas, enforcement and rulemaking procedures, or technical methods to be adopted.

7. Present budgetary need can only be approximated by comparison with tasks and budgets of other air pollution control programs. The wide difference in community standards, tasks performed, and administrative philosophies, ranging from pure persuasion to rigorous court enforcement, makes skill and judgment necessary.

Typhoid Outbreak Source Eludes Investigators

The typhoid fever outbreak in the midwest in 1956 should alert sanitarians to the need for increased vigilance in food sanitation, declared Frank L. Woodward of the Minnesota Department of Health.

If there was a common source of infection in this outbreak, in which at least 6 midwestern States were affected, it must have been some food with interstate distribution, he maintained.

Intensive epidemiological investigation failed to find a "single most likely source," he said, but the evidence, he believes, points to contaminated food shipped interstate. This conclusion is his own, drawn from incomplete, unofficial memorandums, not necessarily that of the investigators, he stated.

Unlike most disease outbreaks, there was no immediate evidence of a relationship between any two of the cases, according to Woodward. There were no two cases in a family or among acquaintances and no common point of assembly, he said. There were no multiple primary cases and apparently no secondary cases.

To illustrate how various factors influence the course of an investigation as an outbreak progresses, he outlined developments in Wisconsin, Iowa, and Minnesota from January through mid-July.

Since the first cases occurred in early January, Woodward said, Christmas-season foods were first considered as a possible source of the infection — chocolated-covered cherries, a hand-finished product, for example. But as new unrelated cases developed in February and March, attention was directed to all foods.

Woodward considers it a likely possibility that a particular food was continuing to be contaminated, probably intermittently, throughout the period. This concept, he said, suggests, among other items, fresh vegetables, such as lettuce and celery.

The outbreak furnishes a challenge to all persons responsible for sanitary control of food production, processing, and marketing, Woodward concluded. Food ingredients as well as finished food and even wrappers and containers require scrutiny, he said.

High Free Residual Chlorine Effective for Pool Waters

The use of high free residual chlorine in swimming pools disposes of the need for standard bacterial tests, according to Dr. Elizabeth D. Robinton and Louise R. Elliot of Smith College, and Eric W. Mood of Yale University.

Tests conducted on samples from four swimming pools under varying conditions show that high free residual chlorination produces water free of pathogenic bacteria. If accurate titrations of the chlorine residuals are carried out routinely, they stated, bacterial standards need not be used to determine the safety of swimming pool water.

This new concept grew out of a search for a procedure that would keep pace with the latest developments in swimming pool water treatment. "Accepted bacterial tests," they said, "are not sufficiently delicate or precise to determine the relatively few organisms which survive high free residual chlorination."

Such chlorination, a relatively new treatment in the United States, is effective even during peak swimming loads and is easy to maintain. Also, they pointed out, free chlorine residuals eliminate the chance that a swimming pool will transmit bacterial disease. Levels of chlorination can be almost immediately ascertained, but bacterial tests may take 48 hours or more.

Claims Dishwashing Devices Remove Sticky Viruses

Home dishwashing machines maintained at the recommended water temperature of 150° F., or above, effectively and consistently removed all detectable influenza A, mumps, herpes simplex, vaccinia, poliomyelitis, and T_1 bacteriophage viruses from dishes excessively contaminated in the laboratory, according to studies reported by Dr. S. Stephen Chapman and Barbara Vinsel of the School of Medicine, University of Louisville.

A sensitive swab technique for detecting viruses on dishes was developed. It was found, using this method, that influenza A, herpes simplex, and mumps viruses remain viable on soiled dishes for at least 24 hours.

Chapman and Vinsel claimed that influenza and mumps viruses were not effectively removed by the usual home, hand-dishwashing manner, stating that the success of viral elimination was quite variable, however fastidious the person washing the dishes.

Optimal sanitizing of viral-contaminated dishes resulted when water temperatures of multiple-rinse home dishwashers were 150° F. and above. Detergents added in both prerinse and wash cycles promoted quickest removal of the viruses. It was apparent that certain basic dishwasher design features were important for rapid virus removal.

Sanitation, Water Supply Stressed by India

Projects to improve India's water supply and sanitation have been given priority since they are vital to the success of the new republic's broad health program, reported Callis H. Atkins, regional engineer, Public Health Service. He served with the U. S. Technical Cooperation Administration as adviser in public health engineering to the Indian Government from 1952 to mid-1955.

Each year, in the 10 years ending in 1950, about 2 million persons died and 50 million became ill from diseases borne by water and filth, according to an estimate cited by Atkins.

A survey in 1949 by a committee appointed by the Ministry of Health attests to the huge tasks facing India. Only 16 percent of the towns had protected water for 6 percent of the population. The percentage for villages was even lower. There were sewers in 23 cities out of 48 with populations of 100,000 and over. In the villages, less than 5 percent of the homes had any kind of latrines.

Project Planning

Impetus for the environmental health projects came, Atkins pointed out, during India's first 5-year plan, which was designed for comprehensive development of the country's social and economic resources. Health projects were set up in se-

lected areas under the Community Projects Administration.

A survey disclosed that there were 50 engineers with graduate training in public health or sanitary engineering. There was no sanitary engineering or public health engineering unit in the national government, although a few states had small organizations. Local production of sanitation equipment was insufficient, making importation necessary.

Funds allocated to the Community Projects Administration for water and sewerage were small, but some states had limited amounts for that purpose. At this point, Atkins said, the Technical Cooperation Administration offered its assistance, and the United Nations International Children's Emergency Fund and the World Health Organization showed interest in taking part.

Operation of the Projects

In August and September 1954, India announced it would aid its states in building water supply and sanitation facilities. About $13 million was offered for passing on as loans to municipalities within 1½ years, but 6 months later the fund had increased to $42 million, allocated to about 250 municipal projects.

For rural work about $6½ million were first channeled to the states on a matching basis. This rose to more than $13 million, a large share being distributed to approximately 100 projects in about 10 thousand villages during the first year. Assistance from the Technical Cooperation Administration, representing 5 percent of total cost, was in Atkins' opinion the catalytic agent in the program's development.

Research and training in water supply and sanitation were accelerated and the scope broadened through the cooperation of the Ford Foundation, the World Health Organization, the Rockefeller Foundation, and the Technical Cooperation Administration.

When possible, equipment and materials were purchased locally to stimulate the country's industry. Indian production of cast iron pipe rose to about 50,000 tons a year, Atkins pointed out, over half the quantity needed. With TCA funds, a large number of trucks, jeeps, pumps, and some engineering equipment were imported.

Public health engineering sections were organized in the Central Ministry of Health and in many states previously without such units. The states in turn charged new district engineer offices and resident engineers in the municipalities with all urban work; for rural operations, the state appointed a public health engineer to head a technical staff for each project. Staff duties included health education and construction of water supplies and latrines. After completion of the project, one sanitarian was to remain for maintenance and general sanitation.

In May 1955 India was looking forward to the fulfillment of 250 urban projects scattered through 17 states, and 100 rural projects in 16 states.

Atkins said that extension of the program is planned under the second 5-year plan beginning in 1956, under which about $135 million has been earmarked for city water supply and sewerage loans, and $62 million for rural projects. The new plan includes funds for training 1,000 engineers, 200 chemists and biologists, and 5,000 sanitarians and allied personnel; as well as funds to support research programs.

In Atkins' opinion the present and projected programs should satisfy major municipal needs in about 25 years, and rural requirements in 50 years if economic conditions remain at the 1955 level. It may well be, however, that simultaneous advances in all phases of the resources development program will cause "geometrical instead of arithmetical progress," bringing India considerably closer to her goal of safe water supplies and a high level of sanitation.

Radiological Health . . .

Data on Radiation Injury Sought for Standards

Plans to expand Public Health Service activities in radiological health were announced by Dr. Clinton C. Powell, who is developing for the Service a program on the medical aspects of radiation.

Parallel to broad environmental control, which is also being expanded, the Service will undertake epidemiological investigation of the quantitative aspects of low-level radiation hazards and other medical research.

To set realistic, yet safe, standards, Powell said, scientists need much more data, especially for humans, on the amount of radiation injury occurring in the population.

Genetic effects, increased incidence of neoplasms, including leukemia, and premature aging must be considered in establishing radiation exposure standards.

Experience to date, Powell reported, indicates that harmful effects of chronic low-level radiation exposures will be delayed for years, or even generations. Since most of these harmful effects will probably be no different qualitatively from disease conditions already present in the population, we must study statistically the incidence of these conditions in exposed and unexposed groups if we are to detect any increase resulting from radiation exposures.

Genetic mutations, he said, are irreversible and have no threshold for their production. Furthermore, the total number of mutations will be

the same for a small dose delivered to a large number of persons as for a large dose delivered to a small number. Thus, a radiation dose must be reduced in direct proportion to the number of reproductive persons involved if the total genetic consequences are to remain constant.

Therapeutic Doses

In the healing arts, he said, there has been an increasing awareness of the possible risk to the patient in diagnostic and therapeutic medical uses of ionizing radiation.

Exposures that might have been acceptable if no other environmental exposure were added now require reevaluation in the light of the total actual and potential exposure that the entire population may receive.

Powell pointed out that a fixed or arbitrary limit on medical radiation exposures would be unrealistic. Circumstances vary so widely in each individual case that the decision in each case must rest with the practitioner. However, he said, the information available to date does not allow the practitioner to make a firm estimate of the possible hazard.

Terming it axiomatic that any exposure should be reduced to the lowest level consistent with good diagnosis or therapy, he designated three immediate measures in equipment and operation, if they are not already employed.

Proper added filtration, he said, collimation of the beam by the use of proper cones, and use of optimal factors, such as higher kilovoltages, can reduce the dose to the patient in many instances and at the same time actually improve the diagnostic quality of the study.

Measuring Radioactivity In Water and Soil

Practical procedures for determining the gross alpha and beta radioactivity of water, soil, and biological samples were presented by Dr. Lloyd R. Setter, G. Richard Hagee, and Dr. Conrad P. Straub of the Robert A. Taft Sanitary Engineering Center, Public Health Service.

The procedures described have applied to surface and ground water throughout the United States during the past 6 years.

They consist of separating the suspended activity by filtration and evaporating the filtrate. The filter and concentrated filtrate samples are placed in separate dishes 2 inches in diameter and dried at 103° C. or ignited at 600° C.

The samples are inserted in a radiation detector called an "internal proportional counter." The detector consists of a methane-argon gas counting chamber, a preamplifier, an electronic scaler, and power supply assembly. For detection, the radiation escapes from the sample, enters into the sensitive volume of the counting chamber, and ionizes the counting gas. The scaler totals the ionization events occurring during a selected time interval.

The detectors have a maximum efficiency of about 50 percent for alpha and 65 percent for beta activity from 1-year-old fission products.

The methods used are suitable for estimating nonvolatile radioactivity at levels below 100 micromicrocuries per liter, the maximum permissible concentration of unknown radionuclides in drinking water. They are applicable at levels exceeding 100 $\mu\mu$c. per liter and may, through decay measurements or a knowledge of radionuclide composition, indicate the health significance of observed activity.

Methods of identifying and determining radionuclides absorbed by soil were described by Bernd Kahn, chief chemical engineer of Sanitary Engineering Center Activities at the Oak Ridge National Laboratory.

Radionuclides are either leached from soil or dissolved with the soil, then separated and purified by radiochemical procedures, and counted with a radiation detector that has been calibrated for counting efficiency.

Kahn presented the leaching procedures for radiocobalt and for radionuclides of the major fission products cesium, strontium, cerium, yttrium, zirconium, niobium, and ruthenium.

He reported that these methods of soil analysis have been largely confined to Atomic Energy Commission installations because of widespread unfamiliarity with radiochemistry. But their similarity to common chemical analyses should broaden their use.

The increased distribution of radionuclides by fallout and by waste discharges has created the need to study the behavior of radionuclides in the environment, he said.

Communicable Diseases . . .

Strep Carrier Rates High In Nashville Children

In view of the scarcity of epidemiological data on streptococcal infections in civilian populations, Drs. Robert W. Quinn, Floyd W. Denny, and Harris D. Riley are studying preadolescent children in three Nashville, Tenn., public schools.

They report extremely high carrier rates of hemolytic streptococci for the children, all normal third and fourth graders, during the first 2 years of study.

Dr. Quinn and Dr. Denny, professors of preventive medicine at Vanderbilt and Western Reserve Universities, respectively, and Dr. Riley, instructor in pediatrics at Vanderbilt, reported the following.

Group A streptococci composed 84 percent of all streptococci recovered.

Fifty-two percent of these strains were typable.

The schools selected for study are in differing socioeconomic areas. Children in one school come from relatively spacious homes where the educational attainments are higher and heating and toilet facilities are better. Carrier rates for this school reached 60 and 42 percent for the study years, 1953–54 and 1954–55.

In the two schools drawing from poorer environments, the rates were not so high, 45 and 26 percent in one, and 41 and 30 percent in the school serving an inferior area.

Possible explanations for the high carrier rates and their differences in the schools and between study years were explored. Meteorological conditions in Nashville were ruled out. And neither environmental factors in the schoolrooms nor in the homes seemed to affect the carrier rates directly. In noting that the presence or absence of tonsils among the children had little apparent effect on the carrier rates, they concluded that more data are needed on this particular characteristic.

Psittacosis a Health Hazard In Oregon Poultry Industry

Psittacosis is increasing in importance as a hazard to poultry workers on farms, in rendering and processing plants, and in poultry marketing facilities, according to Dr. Harold M. Erickson, Oregon State Health Officer, and his associates, Dr. Samuel B. Osgood and Dr. Monroe A. Holmes. They feel that its occurrence in poultry may be of equal or even greater significance to man than the infection in psittacine birds.

In 1956, 86 persons, 27.8 percent of the 309 workers exposed to infected turkeys, became ill with psittacosis in Oregon, Erickson reported. Twenty-eight required hospitalization and two died. Five worked on farms, and the remaining 81 were employed in processing and marketing operations.

How the disease is transmitted in poultry, particularly turkeys, is not known, Erickson stated, but it may be airborne. In a rendering plant, aerosol studies demonstrated tracer bacteria in air samples collected both inside and outside the plant; in a processing plant, inspectors and other workers, as well as those defeathering and eviscerating birds, became ill.

He suggested precautions to minimize the danger of contracting psittacosis. These included antemortem veterinary inspection of all birds, elimination of sick birds from flocks, quarantining of flocks with suggestive symptoms, treatment of infected flocks with tetracycline compounds, strict environmental control in processing plants, postmortem veterinary inspection and condemnation of suspicious birds, rigid personal hygiene and use of rubber gloves and masks by poultry workers, and prompt medical attention to unusual respiratory or pneumonia-like illness in poultry workers.

Erickson stressed the need for research. Until the disease in poultry flocks can be recognized early and controlled promptly, it will be of real significance in occupational health. Psittacosis is also of sufficient economic importance to warrant large expenditures for research and epidemiological investigations, as well as for environmental control, he said.

Texas Q Fever Study Finds Ticks Negative

In an enzootic and endemic area, tests for Q fever vectors among ticks and other arthropods were negative, according to Drs. J. V. Irons, R. B. Eads, and J. E. Peavy, of the Texas State Health Department.

The finding was part of a study covering 64 confirmed human cases and infection in 8 dairies in south Texas in the period from September 1948 through December 1955. The majority of Q fever cases occurred in men living on farms or in towns in southern Texas, where most of the livestock infection was also centered. Circumstances pointed to cattle as the most probable infection source, they concluded, sheep and goats being of minor importance. The search for possible modes of transmission pointed to the drinking of raw milk or inhaling the dust near cattle trucks, barns, and pens.

For diagnosis of the 64 cases, clinical, epidemiological, and laboratory findings were used. The complement fixation test was the most valuable as a diagnostic and epidemiological aid.

The concentration of Q fever in south Texas, mainly in Kleberg and adjacent counties, and the failure to find the causative agent, *Coxiella burnetii*, in many pools of ticks in that area indicate a need for further investigation.

New Bovine Viral Agents Isolated in Michigan

Eight strains of a filterable, cytopathogenic agent were isolated from 52 apparently healthy dairy cattle in Michigan, reported Dr. Calvin M. Kunin of Peter Bent Brigham Hospital in Boston, Mass., and Elva Minuse of the School of Public Health, University of Michigan.

The strains, which are related serologically, do not resemble other human or bovine agents studied.

Cattle kidney tissue culture was the medium used for isolation, which was accomplished, they said, with relative ease. The group of strains was tentatively designated ECBO (enteric, cytopathogenic, bovine, orphan) because their isolation strikingly parallels that of the Coxsackie and ECHO viruses from healthy humans.

The agent produces lesions and multiplies in tissue culture, suckling mice, and chick embryos. When grown in the amniotic sac of 10- to 11-day-old Barred Rock eggs, the agent dwarfed the embryo, denuded the feathers, and released melanin granules into the amniotic fluid.

Antibodies to the agent were not

observed in human or porcine gamma globulin, nor in serum from three farmers in close contact with the infected herd. Such antibodies were found, however, in 90 percent of the herd from which 7 of the 8 strains were isolated.

They speculated that these findings when considered together with the known neutralizing activity against type 2 poliomyelitis virus present in the serum of many cattle may indicate that poliomyelitis-related viral agents will be isolated in the future by similar methods.

Global Campaign Progress Against Malaria Cited

World malaria incidence has dropped by tens of millions in the last few years under the impact of residual toxicants applied nationwide by many countries, reported Dr. Paul F. Russell of the Rockefeller Foundation. But malaria remains a major global disease, he said, probably causing 200 million clinical cases and 2 million deaths last year.

Thus far, energetic measures have erased the disease from wide areas, and its grip on several once highly malarious countries has been broken. The goal of world malaria eradication is no longer utopian, he stated.

Eradication campaigns have four phases, he explained: the preparatory phase, the phase of attack, the phase of consolidation, and finally, the phase of maintenance.

To illustrate the workability of such campaigns, Russell outlined the eradication process in several countries. In Venezuela, DDT residual spraying has removed the disease from all but a few residual foci; in Italy, malaria incidence dropped from 400,000 in 1945 to 5 in 1955; and in Ceylon, spraying is now needed only for jungle areas being cleared for farmland.

He continued with a review of malaria control and eradication projects assisted by the World Health Organization, the United Nations Children's Fund, the International Cooperation Administration, and the Public Health Service. He felt that international funds and technical aid are still insufficient.

He stressed the need for more malariologists, particularly for research. Further study of unsolved entomological problems, such as vector resistance to insecticides, must parallel forward planning of the malaria drive. Fundamental malaria research in the United States must be vigorously renewed if the millions of dollars invested in overseas malaria control are to be protected and global eradication of malaria accomplished.

Chronic Diseases . . .

Suggest Gastric Cancer Tie To Occupation and Nativity

The possibility of etiological links between gastric cancer and occupation and nativity is suggested in a study conducted by the New York State Health Department at Roswell Park Memorial Hospital, Buffalo.

Further testing of the hypotheses is needed, particularly with more widely representative samples of the disease group and the general population, cautioned Arthur S. Kraus, Dr. Morton L. Levin, and Dr. Paul R. Gerhardt.

In a joint report they described the significant and independent associations between the disease and the two epidemiological variables, revealed in a comparison of the histories of 56 adult males with cancer of the stomach and 677 control patients with cancer or nontumorous conditions of other sites.

Significant associations found between occupation and gastric cancer involved exposure to iron dust in metal industries and exposure to inorganic dust with free silica (sand) encountered in such occupations as coal miner and pick and shovel operator in road construction. The investigators noted the similarity between these findings and those of an earlier team of investigators who found an excessive liability to gastric cancer among iron, coal, and slate miners.

The association between gastric cancer and exposure to iron dust became stronger with an increase in the probable duration and concentration of exposure, it was stated. Thirteen percent of the patients with stomach cancer and only 1 percent of the controls had been exposed to iron dust for 10 or more years while working as craftsmen, foremen, operatives, or laborers in blast furnaces, steel works, rolling mills, and various metal manufacturing industries, with the duties including at least 3 years of exposure at probable high concentration. Another 18 percent of stomach cancer patients and 8 percent of controls had been exposed to inorganic dust with free silica for 10 or more years.

These associations between gastric cancer and occupation were found to be independent of the factors of smoking, age, race, marital status, population of place of residence, and (probably) socioeconomic status.

It was also observed that 23 percent of all of the stomach cancer patients had been born in Poland, against 6 percent of the control group. The report suggests that the occupational and nativity associations with gastric cancer were independent of each other and that the factors of Polish birth and occupational exposure to iron dust in the same individuals exert an additive effect.

The finding for Polish births, the report continues, was anticipated in a study by earlier investigators of

male stomach cancer death rates in Boston, in which "Russian born" males (including those born in Poland) had the highest rates. The report also notes that Buffalo's large Polish population does not explain why a greater proportion of the stomach cancer cases than of the controls were born in Poland, since both stomach cancer and control groups included the same proportion of Buffalo residents.

High Blood Pressure Raises Risk of Heart Attack

Men between 45 and 62 years of age with high blood pressure appear to stand a much greater risk of developing heart attacks than other men, affirmed Drs. Thomas R. Dawber, Felix E. Moore, and George V. Mann, National Heart Institute, Public Health Service.

Other factors which may have a probable relationship are obesity, high blood cholesterol, liver disease, and chronic arthritis and rheumatism, they said in reporting preliminary findings from data accumulated during the first 4-year followup period in a long-term epidemiological study of heart disease at Framingham, Mass.

The community is being observed over a long period to discover how many people have heart disease, what types they have, when it develops, and what factors seem to be associated with it. More than two-thirds of a random cross section of Framingham residents between 30 and 60 years of age were given a complete, initial physical examination during 1948–52, and are being reexamined at 2-year intervals.

Comprehensive data are recorded on all conditions which medical scientists suspect may be related to the development of heart disease. Comparable data collected from both those who remain free of heart diseases and those who subsequently develop them are then analyzed to disclose what factors may be related to the development of disease.

Fifty-two of 900 men between 45 and 62 years of age developed coronary heart disease during the first 4-year followup period. This limited number permitted only tentative conclusions.

High blood pressure and hypertensive cardiovascular disease were found to be strongly associated with the development of coronary attack. High incidence rates in participants with high blood pressure were closely correlated with electrocardiographic patterns consistent with left ventricular hypertrophy.

Obesity appeared clearly related to the risk of coronary attack. The upper 10 percent of overweight men showed an attack rate three times as great as men whose weight was below the median.

Liver disease appeared to increase the risk of coronary attacks as did the presence of chronic arthritis and rheumatism.

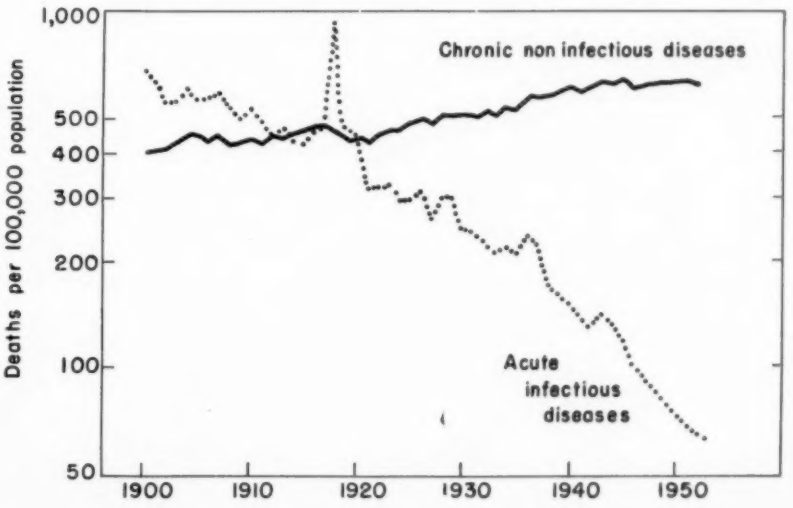
Socioeconomic status seemed to have little relationship to the risk of developing coronary heart disease. Persons with grade school education did not have significantly higher rates than the group as a whole.

The incidence of coronary disease showed a correlation between sex differences and amount and severity of disease. A 4-year rate of 12 per 1,000 was observed among men 30 to 44 years of age, while no new cases of disease were found among women in this age group. The 4-year incidence for men 45 to 62 years of age was 58 per 1,000, exactly double that observed among women. Significantly, more than one-fourth of the coronary disease cases among men within the followup period were fatal; most of the deaths occurred suddenly before the patients could be hospitalized.

Limitation of Interviews Noted in Illness Survey

The prevalence of chronic diseases as measured by household interviews and by clinical examinations was compared statistically in the Baltimore chronic disease survey

Deaths from Chronic Diseases Increase



Reported causes of death indicate that fatalities from acute infectious diseases are declining almost to the vanishing point. On the other hand, deaths caused by chronic noninfectious diseases seem to be almost as frequent as those formerly caused by infections. (*PHM chart*)

conducted in 1953–55 by the recently disbanded Commission on Chronic Illness.

Dean E. Krueger, assigned to the survey by the National Heart Institute of the Public Health Service, reported that household interview data grossly understated the prevalence of chronic diseases.

Clinical examinations are recommended rather than household interviews as a method for studying the prevalence of disease, but it was observed that the amount of disability resulting from chronic disease can be measured as well by interview as by any other method.

The Baltimore interviews yielded only one-fourth of the cases of chronic diseases that were diagnosed by subsequent clinical examination, Krueger said. He added that the completeness of household reporting of disease varied widely among diagnostic groups, that there was no difference in completeness of reporting by severity of the case, that no group was identified for which the reporting of diagnosable chronic conditions in interviews was high, and that proof of the reliability of clinical examinations as a means of measuring the prevalence of chronic disease is needed.

"If clinical examinations are to be used more extensively in studies of the prevalence of chronic disease, criteria for diagnosis should be developed which would emphasize the need for uniformity for research purposes without denying the importance of clinical judgments," he commented.

Reasons for the inadequacy of the interview included lack of knowledge of the condition, use of household rather than individual respondents, deliberate withholding of information, differences in concepts of what constitutes disease and symptoms, limitations of the questions asked, language difficulties, and low mentality of some respondents.

Nonreporting in interviews, Krueger continued, reflected people's deeply ingrained attitudes, their social patterns, and capacities which are not amenable to rapid change.

The Baltimore study provides good evidence that, even though some improvement in content and technique of interviewing can be made, the interview is not likely soon to become a valuable tool in measuring the prevalence of diagnosable chronic diseases, he concluded.

Survey methods used in the study included interviews with a sample of 3,700 households having 11,574 members and clinical examinations of 809 individuals from a subsample of 1,292.

The interview questionnaire included both general questions about sickness, injuries, impairments, and chronic conditions, and extensive checklists of chronic diseases and symptoms of disease. Participants in the subsample had their medical history taken by specialists in internal medicine and received a physical examination plus a battery of medical tests.

Laboratories Can Improve Heart Disease Tests

Within the scope of their present functions, public health laboratories can contribute to control of heart diseases by work on certain laboratory tests and procedures now used in diagnosis and management of these diseases, said Dr. Robert W. Berliner and Dr. William H. Stewart of the National Heart Institute, Public Health Service.

Among the tests and procedures Berliner named were cholesterol determination, prothrombin determination, and methods for obtaining laboratory evidence of streptococcal infection. In most instances, what is needed, according to his analysis, are techniques that will permit mass use of the tests.

Cholesterol and Lipoproteins

Emphasizing the importance of cholesterol determinations, Berliner pointed out that a relationship between elevation of plasma cholesterol concentrations and atherosclerosis has been established although the nature of the relationship is yet to be determined. Also, he said, it is generally assumed that a regimen that reduces the concentrations will favorably influence the course of the disease. Thus, physicians are using the test more and more as an aid in management of atherosclerosis.

But at present cholesterol determinations on the same blood specimen done by various laboratories are not always in agreement, Berliner observed; hence, the need for a reliable, reproducible test. Development of such a test, he said, might require modification of laboratory procedures, establishment and maintenance of standards, and special training for technicians.

It has been suggested that determination of the amount of the low-density lipoproteins may be of unique value in identifying individuals who are developing atherosclerosis, Berliner continued. The most recent evidence, however, does not support this view, and the expensive apparatus needed for this type of analysis does not appear, at this time, to be warranted.

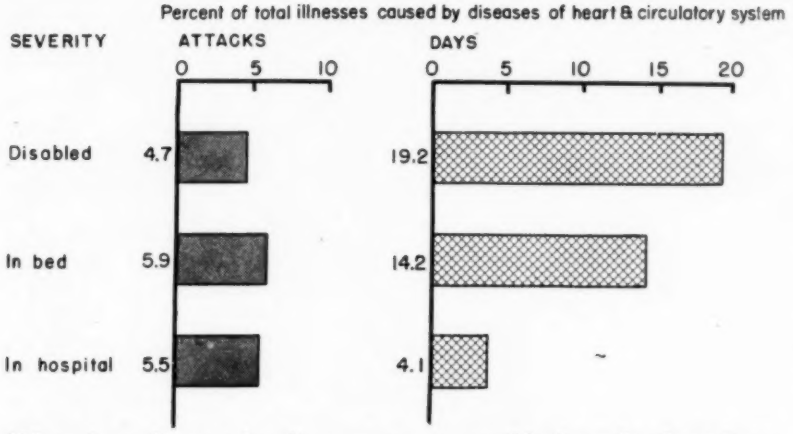
Other Tests and Procedures

Prothrombin determinations are needed for monitoring prothrombin activity and maintaining coagulability of blood within safe limits when anticoagulants are being used for coronary artery disease. Here again, Berliner indicated, what is needed is a completely reliable, reproducible test that can be done routinely on a large scale.

For differential diagnosis of myocardial infarction, a determination of the serum transaminase levels can be helpful. According to Berliner, transaminase determination is now in the transitional stage between use by basic and clinical laboratories and prospective large-scale use by practicing physicians.

The key to prevention of initial attacks of rheumatic fever is prompt and adequate treatment of infections caused by beta hemolytic streptococci. Also, subsequent attacks of rheumatic fever can be forestalled by a program of medication

Measures of Morbidity for Cardiovascular Diseases



Although cardiovascular diseases are responsible for only about 5 percent of the attacks of disabling illness, they cause about 19 percent of the days of disability in a white, urban population and account for about 14 percent of days in bed with disabling illness. (*PHM chart*)

designed to prevent streptococcal infections of the throat.

Physicians are usually quick to initiate antibiotic therapy for even a suspected streptococcal infection, Berliner remarked, but he said they may need laboratory evidence of the infection to justify continuance of treatment for the time required to prevent rheumatic fever. Thus, it is necessary for physicians to have available to them the means of obtaining accurate and inexpensive throat cultures, he declared. He considers the "provision of the means" a challenge of outstanding importance to public health laboratories.

Need for Chronic Disease Programs Reported

The question of whether the future of sound health department practice in the chronic disease field lies in programs of health promotion, disease prevention, treatment, and rehabilitation rather than in services developed according to disease categories, was raised by Dr. Jonas N. Muller, director, department of preventive medicine, New York Medical College, and Edward B. Kovar of the United Community Service of Metropolitan Boston.

In a survey of 187 local health departments, the Subcommittee on Chronic Disease and Rehabilitation of the APHA Committee on Administrative Practice found few examples of an integrated chronic disease program although these departments provided many and varied services for the prevention and management of chronic disease and disability, Muller reported.

Almost 60 percent of the surveyed departments consider chronic disease activities a major responsibility of the health department. However, all departments provided many services for the prevention or management of chronic disease or disability, Muller said. Departments which are responsible for general medical care programs, hospitals or institutions, or for both have more services or personnel concerned with chronic disease activities than do departments with no such responsibilities, he stated. A few local health departments reported occupational health programs which give special attention to chronic diseases and disabilities. Fewer than one-third reported promotion of local inplant health service in industry.

Over 60 percent of the departments surveyed had made or had assisted in community surveys of chronic disease problems, needs, services, or facilities; many had made special studies. Almost all departments reported some activity which helps to develop, strengthen, and coordinate community chronic disease services, Muller stated.

He said that community educational activities include public information, distribution of educational materials, exhibits, and speeches at public meetings, illustrated by films and other materials. Some health departments help plan professional school curriculums, staff part of the programs, and, through inservice institutes, take part in the postgraduate education of nurses and occasionally of physicians.

Some health departments provide medical consultation to vocational rehabilitation agencies and welfare authorities. Welfare workers, in turn, provide consultation on economic status and welfare problems of health department patients.

Most health departments offer preventive and diagnostic services; some provide treatment services and a few, rehabilitation services, Muller reported. However, departments providing treatment or rehabilitation services, or both, for children and adults or for adults only are greatly outnumbered by those which provide such services for children only, he said.

Simultaneous screening programs for more than one disease are among the chronic disease activities of some local health departments, and a few departments give group instruction in nutrition or obesity control, Muller stated.

Cooperation between health departments and other community agencies was an important finding of the survey, Muller stated. The services of social workers, nutritionists, health educators, psychiatrists,

psychologists, and physical or occupational therapists who were employed by agencies other than the health department were available to public health nurses. A few local health departments assist community individual care programs through grants and other forms of financial aid and provide equipment, supplies, and prosthetic devices to other agencies, he said.

In closing, Muller emphasized that efforts to reduce the burden of chronic disease are fully justified but that much information is needed "before the programmatic concept can be applied more generally to developing chronic disease services."

Medical Care . . .

Major Expense Insurance Raises Basic Issues

By challenging the fundamental concepts on which voluntary health insurance was grounded and by forcing a reappraisal of health insurance objectives, major medical expense insurance has become a critical issue in insurance circles, according to Jerome Pollack, social security consultant, United Automobile Workers.

This significant new form of health insurance, Pollack explained, requires the insured to assume the full cost of a segment of health care, the first $100, for example, in medical expenses before major expenses begin. Thereafter, it offers reimbursement for most of the cost of a broad spectrum of health services up to a maximum amount, typically, $5,000 or $10,000. The broad range of services includes hospital and medical care, private nursing, drugs, and medicines.

The insurance is based on three fundamental premises: If minor expenditures are not insured, more can be spent for protection against major illness. Small claims should wherever possible not be insured because their handling is too expensive for the benefit derived. If the insured is made to share directly in the cost of the services he receives, he will be motivated to purchase care economically.

Opponents of this insurance fear that it will misdirect and critically inflate the cost of health insurance, that it creates economic pressures which fall unequally on subscribers, that it would emphasize economic rather than medical considerations for developing health services, and that it abandons preventive care as a covered benefit.

The issues raised set reimbursement against direct service; partial against full payment, and standby rainy day coverage for financial emergencies against full coverage of everyday health care.

Pollack described the issues created by this form of insurance, offered judgments supported by new data, and analyzed the basic precepts, with implications of concern not only to organized labor but also to employers and insurance companies.

"Major medical insurance is an attempt to design an appealing arch without a foundation," Pollack stated. "It may prove to have specialized value for people in the upper income categories who have greater need for financial protection against excessive costs than for general prepayment. But persons with lower income will probably continue to need coverage extending far into minor care, even if this amounts to prepayment rather than insurance."

This move to extend coverage is not a panacea for the ills of health insurance, Pollack indicated. He regards it as a bid for preeminence in the health insurance market, and as an effort to make the contingency conform to the insurance rather than the insurance serve the contingency. Also, its introduction may hasten more complete coverage and more inclusive benefits in competing plans, he said.

Still unsolved, he said, are many basic questions concerning benefits, rates, and valid controls to prevent unwarranted inflation in health service costs. Costs to the insuring firm can be cut through use of deductible and co-insurance provisions, Pollack said, but their impact is little understood, he added.

Major medical insurance may in time become a catastrophe rider, with or without deductible or co-insurance clauses, in improved basic plans, Pollack believes. In his opinion, it is not now a satisfactory replacement for basic coverage. "The dilemma is that the only alternative plans available to most people also have serious gaps and deficiencies," he concluded.

Tests Method for Rating Medical Management

By using written standards in analyzing hospital case records, independent observers can achieve reasonable agreement in rating quality of medical care, stated Dr. Leonard S. Rosenfeld, director of the medical care evaluation studies, United Community Services of Metropolitan Boston.

The method was tried in 2 teaching hospitals and 2 community hospitals. Each item of medical care in selected case records was rated "good," "fair," or "poor," on the basis of written standards, and total ratings for each medical specialty were obtained according to prescribed procedures.

Agreement between pairs of observers working independently was better than random although less than perfect, Rosenfeld said. Since many of the differences in ratings were attributable to situations not covered adequately by the stand-

ards, he believes that a substantially higher degree of agreement could be obtained with revised standards and improved methods of orienting the observers.

The hospital record, believed by some to be inadequate for evaluation of medical care, proved a reasonably valid basis for such evaluation in this study, Rosenfeld maintained. Furthermore, he said, deficiences in the record are in themselves serious since the record is the main line of communication among the many individuals concerned with the hospital patient.

This evaluation method also proved fairly sensitive. According to statistical tests of significance, the difference between the two teaching hospitals barely bordered on significance, but the differences between the teaching hospitals and the community hospitals were highly significant.

Rosenfeld suggested that standards similar to those used in this study may have many applications. Most immediately, he said, they could be used for self-evaluation by medical staffs. The approach offers some promise as a method of comparing performance among institutions.

The objective of the research, according to Rosenfeld, is to develop a method of measuring the quality of medical care that will be suitable for evaluating the effects of community organization of health services. Clinical evaluation of quality is more valid than statistical measures, but it is less precise, he pointed out.

ILWU Welfare Fund Gives Dental Care to Children

Provision of dental care by their union has removed financial and most other deterrents to visits to the dentist by children of longshoremen in the Pacific Coast States, stated Goldie Krantz, secretary of the International Longshoremen's and Warehousemen's Union and the Pacific Maritime Association Welfare Fund, San Francisco.

Beginning in the fall of 1954, pilot dental care programs were set up in a number of Pacific coast ports, with the advice and assistance of the dental profession, Krantz reported. A service plan provided almost complete dental care for a year. Under an indemnification plan, a charge was made for each service. The plans used both closed and open panels of dentists. The open panel included all dentists who were members of the American Dental Association. Both plans excluded orthodontia, cosmetic care, and dental care provided under the union's health program, Krantz said. In Oregon and Washington, bridgework, space maintainers, and topical fluoride treatment also were excluded.

The ILWU-PMA Welfare Fund sponsored both plans in California. In Oregon and Washington, the indemnification plan was sponsored by the fund; service plans were set up by the State dental societies for the fund.

Children were enrolled at local unions in the plan of the parents' choice. The number of children enrolled were:

Area	*Service plan*	*Indemnification plan*
California:		
San Francisco	1,795	1,447
Wilmington Harbor	1,843	1,108
Oregon	1,666	22
Washington	1,949	127

Costs of Care

Costs for complete dental care were based on results of a sample study of the children. A schedule of fees determined the maximum amount to be paid for a given service. Payments by the union to the service plan were made only for children seen by a dentist rather than for children enrolled, Krantz said. However, the dental profession, the service plan, and the trustees of the welfare fund combined their efforts to get children to a dentist.

An insurance company acted as agent for the welfare fund in paying the dentists. A deposit premium and an accident premium were paid for each child enrolled plus a percentage of the total premiums to cover the administrative cost of handling claims. Any part of the deposit premium not spent for services at the end of the year was returned to the fund, Krantz stated.

Costs were reviewed and audits certified quarterly. Under the service plan, costs could be renegotiated every 4 months; if needs had been greater than anticipated, the union would either pay a larger deposit premium or would reduce the services contracted for. Under the indemnification plan, it was not necessary to renegotiate the deposit premium during the year. During the first year of the program, $630,000 was spent by the welfare fund for dental care for children of union members. No decrease in services nor increase in fees was necessary, Krantz said.

Utilization of Services

Based on 12 months' operation, the percentages of utilization of dental services for children from birth through 14 years of age were:

Area	*Service plan*	*Indemnification plan*
California:		
San Francisco	80	65
Wilmington Harbor	90	59
Small ports	-----	51
Oregon	76	77
Washington	78	58
All areas	81	62

Evaluation and Education

A dental advisory board made up of the dean of a dental school, a public health dental officer, and a member of the committee on dental care of the California Dental Association checked the quality of care furnished under the program. All

information on the plan sent to ILWU families and all publicity were agreed upon by the trustees of the fund, the dental societies, and the insurance company.

The dental societies provided speakers for family meetings, sent letters encouraging appointments to each child and letters to dentists clarifying misunderstandings regarding fee schedules. The importance of these contributions to the program cannot be overestimated, Krantz said.

Beginning in July 1956, the dental care program was extended for a full year. In some areas, this meant an extension of 21 months beyond the pilot year, she stated. A quantitative study of the results of the first year of the program is in progress and a report will be available next spring.

Offers Plan for Promoting Family Health Services

The growing significance of industrial health services to the family is intimated in the paper presented by Dr. Harold J. Magnuson, chief of the Occupational Health Program of the Public Health Service, who offers a tip for alerting health departments.

Industrial health services become family centered as families move into industry-centered communities, Magnuson pointed out, where industrial plants are the focal point of social activities and other enterprises requiring cooperative group action.

Even though the contributions of industrial medicine to society are already considerable, their influence is increasing. Some of the factors aiding this development, he said, are the numbers of women in the work force, the mobility and high educational level of the American worker, and the changing character of industrial hazards.

Occupational hazards endangered family health in the past only in isolated instances, Magnuson stated, observing that the major threat revolved about infectious diseases, such as tuberculosis, which might be brought to the home.

The industry of the future, with its emphasis on automation, electronic and chemical operations, and nuclear energy, will introduce a new dimension in health problems, having potentially far-reaching effects, Magnuson noted. An example, he added, is ionizing radiation which, unless adequately controlled, may affect unborn generations in the families of exposed workers.

The trend in industrial health programs is toward anticipation of disease as well as prevention, he observed. Industrial and commercial establishments, sensitive to the needs of employees, are willing to spend far more on health security than the public health department is able to spend, he continued.

Formerly limited to preemployment examinations, traumatic surgery, and compensation medicine, industrial health programs have stepped up their services, Magnuson indicated, and now offer preplacement examinations, periodic health examinations, and health education and counseling services.

The preplacement examinations are devised to match the worker to the job and to safeguard his health. The periodic examinations prove particularly useful in the detection of nonoccupational disabilities. And the other services are augmented by referrals to appropriate community health and social resources.

Remarking that these gains have been limited to large industries, Magnuson noted that some small establishments have been able to overcome the financial obstacles to similar services only by such devices as banding with other plants. Various plans of such cooperation have evolved over the past 15 years, he said.

He recommended that health departments seize this opportunity to work with industry in developing a "tailor-made plan" that can be adapted to any group of small industries.

By working through industry-centered communities, the health department can add immeasureably to its own resources in the prevention and control of chronic and degenerative disease, he pointed out. The health department, he said, would in effect thus establish numerous branch offices devoted to adult health promotion.

Outpatient Department Tries New System

By coordinating clinic services and instituting regularly scheduled appointments, Boston's Beth Israel Hospital has overcome several defects in outpatient care, according to Dr. Sidney S. Lee, assistant director.

Until 2 years ago, a typical diabetic outpatient at Beth Israel consumed almost 4 hours per clinic visit, Lee reported. The patient was seen by the physician in the diabetic clinic on the first floor, by the nutritionist in the food clinic in the basement, then by the chiropodist on the second floor.

From there he was directed to the social worker on the third floor and out of the hospital by way of the pharmacy on the first floor. His time, often at a financial loss, was thus consumed in waiting and travel.

Relocation of the chiropodist, the nutritionist, and the social worker in the clinic adjacent to the physician and laboratory has reduced the diabetic patient's time in the clinic to 45 minutes, Lee reported.

The new arrangement makes it possible to resolve conflicting opinions on the spot rather than merely to enter them in the patient's record. The number of visits has been reduced for each patient.

The appointment system established 3 years ago at Beth Israel brings 97 percent of all outpatients to the clinic at the time the physician will see them. In most clinics, the patients are seen by the same physician on each visit.

Benches in a given clinic area are

now fully occupied only at peak hours, not for the half or full day. Half of the benches have been removed altogether. Patients no longer complain about long periods of waiting or show other signs of irritation. Physicians and nurses are relieved of pressure. Clinic administration has been simplified by the spreading of the load.

Lee recommends that other hospitals follow suit in reappraising and relocating services. He would avoid fragmentation of care, another defect in outpatient clinic services, by having each patient treated by the same physician, then followed through a continuous system of recorded medical and social information that can be extended, eventually, to communitywide medical care.

Physicians' Views Influence Relationship With Patients

Physicians' tendency to underestimate patients' level of medical knowledge is one reason why physicians give their patients little information about their condition, according to a report by Drs. Lois Pratt, Arthur Seligman, and George Reader of Cornell University Medical College.

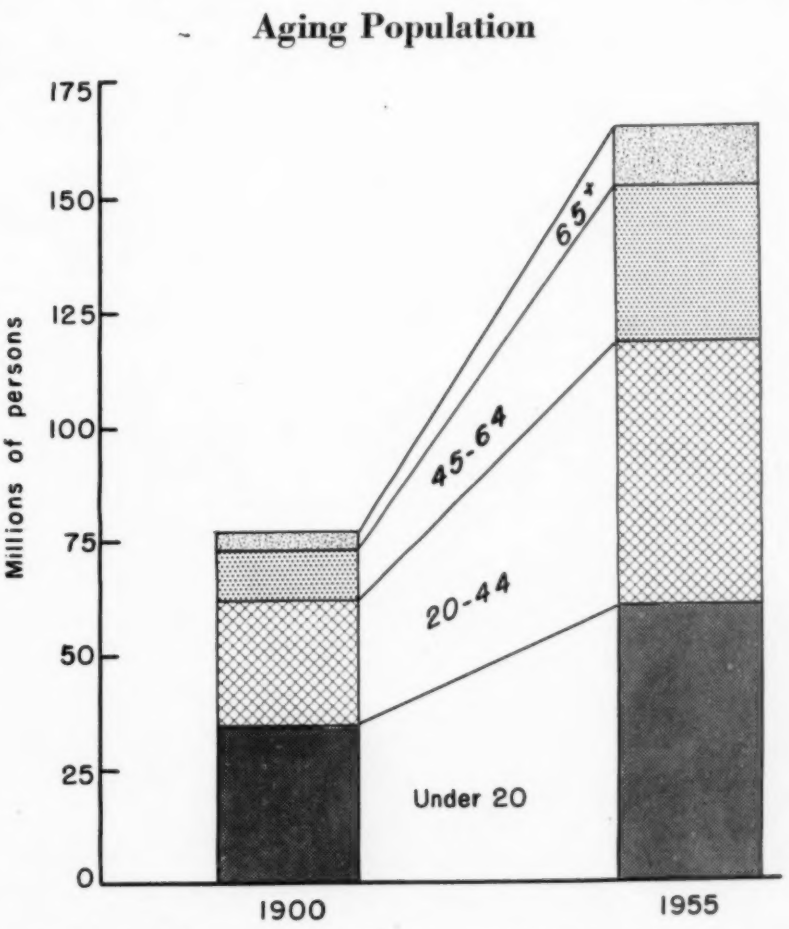
In a study of physician-patient interaction in a large metropolitan outpatient clinic, Pratt stated, 81 percent of 89 physicians underestimated the level of medical knowledge of the clinic patients. Such physicians tended to have less discussion with patients than did others.

Analysis of 50 physician-patient relationships showed that most of the patients were told only a few isolated facts about their condition, Pratt observed. The physicians were more likely to avoid completely discussion of the etiology and prognosis than of such immediately practical matters as tests and treatment.

At the same time, the physicians felt that the patients ought to have a considerable fund of medical information, much more in fact than they actually did have, she pointed out. On a test of 36 routine questions about 10 common diseases, the physicians thought the patients should know the answers to 82 percent, but the patients actually answered correctly only 55 percent.

Also undoubtedly related to the limited discussion between physicians and patients, Pratt said, are the patients' actual low level of medical knowledge and their lack of overt interest in receiving information. The 50 patients studied gave little evidence of conscious, aggressive demand for information from the physicians although the majority appeared to have an unformulated, latent desire for information.

The dynamics of the situation are something like this, the study has indicated: When a physician believes his patient to be rather poorly informed, he considers the tremendous difficulties of translating his knowledge into language the patient can understand, along with the dangers of frightening the patient, and decides to avoid elaborate explanations. The patient, in turn, reacts dully to this limited information,



In a 1955 population of 165 million, persons aged 65 and over comprise less than 10 percent of the total. Although their numbers increased from 3 million in 1900 to 14 million in 1955, the percentage of those 65 and over rose only from 4.1 in 1900 to 8.6 in 1955. The proportion of the aged appears likely to gain a little in the succeeding decade. (*PHM chart*)

thus strengthening the physician's view and reinforcing his tendency to avoid discussion.

How does the amount of information the physician gives his patient affect the patient's health? This question, Pratt admitted, cannot be answered yet, but, she said, it seems that patients who are given rather thorough explanations participate more effectively in discussion with the physician and are more likely to accept completely his plans for tests and treatment than those who are given little information.

Concept of a Good Physician

Technical competence and skill in handling interpersonal relations received about equal attention in the patients' descriptions of a "good" physician, according to another report of the research at the outpatient clinic. In addition to Pratt and Reader, Margaret Mudd, also at Cornell University Medical College, participated in this report.

About 60 percent of the 50 patients studied mentioned technical competence as an attribute of a good physician, and 58 percent mentioned such factors as kindness, understanding, interest in the patient, sympathy, encouragement, honesty, sincerity, inspires confidence, and "is not in a hurry," Pratt stated. About 24 percent considered both technical competence and interpersonal relations important; about 36 percent mentioned only the former; and about 34 percent mentioned only the latter.

This research, Pratt noted, is designed to determine what constitutes adequate care for patients, to evaluate the adequacy of care offered by the clinic, and to define the role of an outpatient clinic. What patients expect is one element to be considered in establishing standards of care, she said.

Medical Care Goals

Interviews with the 50 patients and observation during their consultations with the physicians provided the following additional information:

The dominant initial goal of two-thirds of the patients was to find out whether they had a serious disease; the rest either wanted a thorough study and a diagnosis or were concerned primarily with treatment.

Almost three-fourths of the patients wanted some kind of treatment or symptomatic relief, and two-thirds of this group specified the kinds of medication or the particular result they wanted. This finding, Pratt observed, demonstrates the pressure physicians are under to give symptomatic treatment.

Most of the patients expressed some interest in obtaining basic information about their problem. However, few made any particular effort to do so by direct questions to the physician or criticized the physicians for not providing it. Apparently, although they have a desire for such information, the clinic patients do not feel that it is the physician's responsibility to provide it, Pratt said.

The patients were notably vague and uncertain about what they thought would be done during their clinic visits, that is, about what types of questions would be asked, whether or not tests would be given, and the like. Also, although most of the patients expected positive results, few hoped for complete cure, and still fewer were really confident of a complete cure. The majority expected symptomatic treatment and reassurance.

Labor Views Medical Care For Industrial Workers

Payments provided by the majority of medical care insurance plans are insufficient to cover the cost of most illnesses, asserted James Brindle, director, security department, United Automobile Workers, Detroit, Mich.

Brindle pointed out that substantial charges are often added to basic indemnity payments for physicians' services and that provisions of income-ceiling service plans often are not enforced. In many cases, only indemnity insurance is provided, he said, and in some areas which have income ceilings, the ceilings are much too low. UAW has been urging a $6,000 ceiling for nearly a year and a half but "we are not at all sure that coverage will become available at reasonable cost." In one city where an attempt is being made to develop a $6,000 ceiling plan, the premium asked is unreasonably high, he said.

Provisions of income-ceiling service plans often are not uniformly enforced, Brindle continued. A UAW survey of charges to workers under the $5,000 family income-ceiling plans showed that physicians make added charges in as many cases when income is below the ceiling as when it is above the $5,000 figure.

UAW has been more successful in obtaining full payment of hospital bills than of bills for physicians' services, Brindle said. However, in his opinion, schemes for reimbursing hospitals for services to patients generally do not furnish incentives toward economy and efficiency.

Increased Premiums

The emphasis of most plans on in-hospital care and surgery has led to a substantial amount of hospitalization which is not medically indicated, and this increases prepayment costs, Brindle stated. Indemnity plans keep premiums low by reducing benefits, but service plans steadily increase premiums, he said. Coinsurance, deductible programs, and so-called major medical coverage only shift more of the burden of illness from the group to the individual, he asserted. Brindle emphasized, however, that labor's concern with increased costs of medical care is directed at remediable situations and not at broadening of benefits and justifiable improvements in wage levels, working conditions, and technical facilities.

Areas of Coverage

The focus of labor's demands on health insurance is changing from comprehensive benefits and exten-

sion of services to organization and quality of medical care, Brindle said. In his opinion, individual health needs can be met only by complete prepayment for a comprehensive range of covered health services, rational organization of medical services, and direct attention to the quality of these services.

When all medical services are included in an insurance plan and are completely prepaid, there will be "no artificial encouragement of medically unnecessary surgery or hospitalization" and medically appropriate services will be used, Brindle stated.

Organization of Medical Care

UAW "is firmly convinced that the problems posed by the increasing complexity of medical science and technology can be met in large part by group practice," Brindle said. Group practice, coupled with complete prepayment for services, will encourage preventive medicine as a matter of good economics as well as good medicine, he asserted.

However, he pointed out, within the group the personal physician must have a central place, for "the personal and confidential relationship between patient and doctor represents the cornerstone of personal health service." But back of the physician must be the specialists, who will work with him to provide complete and balanced health services.

Concerning reimbursement, Brindle said that the method used should relieve the physician of preoccupation with business and fiscal matters and allow him to devote himself to caring for his patients.

Quality of Medical Care

Despite the long history of a "hands-off" policy toward supervision of medical care by insurance plans, such supervision must be developed, not only to control the quality of medical care but to prevent the abuse of medical services when benefits are broadened, Brindle declared. He suggested that a system of evaluation and professional review by a committee, such as is used by one Canadian plan, might improve the quality of care provided by prepayment programs.

Provision of completely prepaid, comprehensive medical care will be achieved only through "bold and imaginative experimentation," and unions will support such experimentation, Brindle stated. He said that the president of UAW had met recently with a group of interested community leaders in Detroit "to set up a comprehensive medical care program based on group practice by salaried physicians in community hospitals," open not only to UAW members but to everyone in the community.

Management Reviews Medical Care Plans

Industrial management is becoming increasingly interested in nonoccupational medical costs and means of paying them, including comprehensive health insurance and other prepayment plans, stated E. S. Willis of the General Electric Company, New York, N. Y.

Medical insurance should provide broad coverage, Willis said, and should pay the major portion of the larger, unpredictable costs of injury or illness, both in and out of hospitals, including specialist care and variable costs such as those due to complications and geographic location. The individual can take care of small bills or bills for preventive medical care, which can be foreseen or planned for, he stated. When small bills occur with such frequency that they become a financial burden, insurance should help in paying them. Medical expenses, although not "happy" expenses, have a definite place in the normal living budget, he emphasized.

Prepayment plans are a form of installment buying, Willis said, and provide basic protection against medical costs. However, they should never supersede direct participation by the individual in payment for medical care. The best individual medical care, Willis pointed out, results from the private practice of medicine, under which the patient has free choice of physician and service and under which he maintains a personal interest in the cost and quality of his medical care.

Epidemiology and Statistics . . .

Controlled Field Trial Of Typhoid Vaccines

Controlled field trials of prophylactics represent one of the most important steps in modern medical progress, asserted Dr. Branko Cvjetanović, of the University of Zagreb School of Public Health, Zagreb, Yugoslavia.

Cvjetanović reported that a trial of typhoid vaccines carried out in Osijek, Yugoslavia, in the spring of 1954 and 1955, demonstrated that it is possible to prepare an antityphoid vaccine that is effective for man. This was the first strictly controlled field trial of typhoid vaccines in the history of medicine, he stated. The study was aided by the Public Health Service and the World Health Organization. He stressed the value of a pilot trial and reported that the problems and results of the full-scale field trial were anticipated by the preliminary pilot test.

Typhoid infection in the usual laboratory animals bears no resemblance to typhoid infection in man, and laboratory potency tests cannot be interpreted conclusively because results apparently are more dependent on the tests used and the method

of performance than on the efficacy of the vaccine, Cvjetanović said. Therefore, the issues raised by the differing opinions of laboratories, field workers, and health authorities can be resolved only by a controlled field trial.

Alcohol-killed and alcohol-preserved vaccines and heat-killed, phenol-preserved vaccine were tested on volunteers, using Flexner II phenolized vaccine as a control, Cvjetanović said. Phenolized vaccine proved to be superior to alcoholized vaccine, which suggests that Vi antigen may not play the major role in protection against typhoid fever. The Vi titer in the serums of vaccinated persons was significantly higher following use of alcoholized vaccine. Thus, the vaccines used could be differentiated from each other by serologic tests on vaccinated persons, he stated.

The results of currently used laboratory potency tests of vaccines in animals are not yet comparable with results of potency tests in the field, and further investigations are needed, Cvjetanović stated. Among the questions still to be answered by controlled field trials are the value of acetone-dried and other types of vaccine and the protection conferred by 2 injections of antigen compared with that conferred by 3 injections, he concluded.

Influenza B Vaccine Of Little Value in 1955

In evaluating the effectiveness of influenza vaccines, the Laboratory of Infectious Diseases, National Institute of Allergy and Infectious Diseases, Public Health Service, reported that though type B oil adjuvant vaccine provided definite protection against epidemic disease caused by influenza B virus which occurred in 1955, the amount of protection was slight and perhaps of no practical consequence.

An antigenic shift in type B influenza virus strains, sufficient to overcome immunity to early strains, was suggested as one possible explanation for the lack of better protection.

As compared with influenza A, the infrequency with which influenza B occurs in epidemic form has made evaluation of vaccines difficult in the past, according to the laboratory.

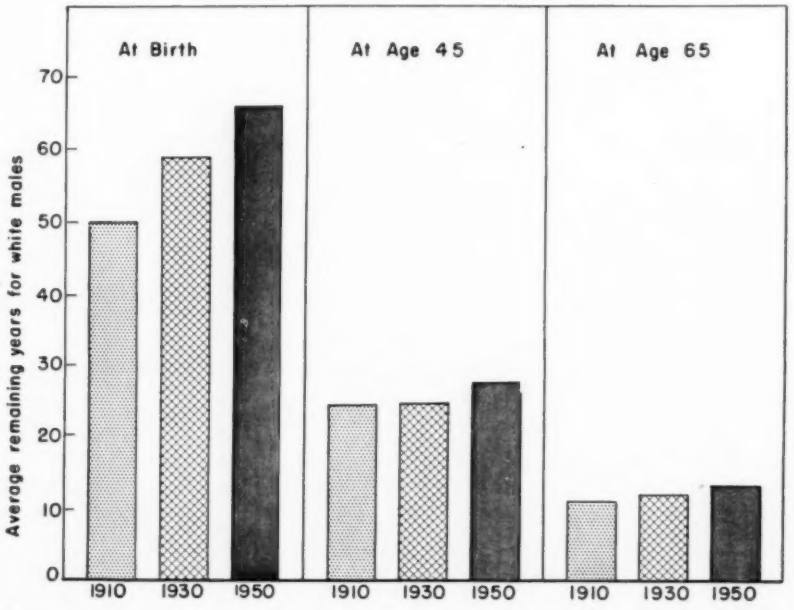
Participating in the present study, one of a series, were Drs. Robert N. Philip, Joseph A. Bell, Dorland J. Davis, Joseph I. Engler, Gilbert W. Mellin, and Kenneth K. Takemoto. All were members of the laboratory staff during the study.

The laboratory tested the efficacy of the following types A and B monovalent inactivated virus vaccines on separate groups of persons each fall: in 1951 and 1952, two type A (A/PR8, A/FW/1/50) and two type B (B/Lee, B/Va/1/50) mineral oil adjuvant vaccines; and in 1953 and 1954, two oil adjuvant (A/FLW/1/52, B/Lee) and two aqueous (A/FLW/1/52, B/Lee) vaccines.

Ten thousand forty-six persons who received only a single dose of vaccine in one or another of the study years were observed for the occurrence of acute febrile respiratory illness (AFRI) during a 7-week outbreak of influenza B in the winter of 1955. Definitive diagnosis of influenza was based on laboratory isolation of influenza virus from AFRI, defined as sudden illness affecting the respiratory tract, lasting 2 or more days, and accompanied by an oral temperature of 99° F. or above.

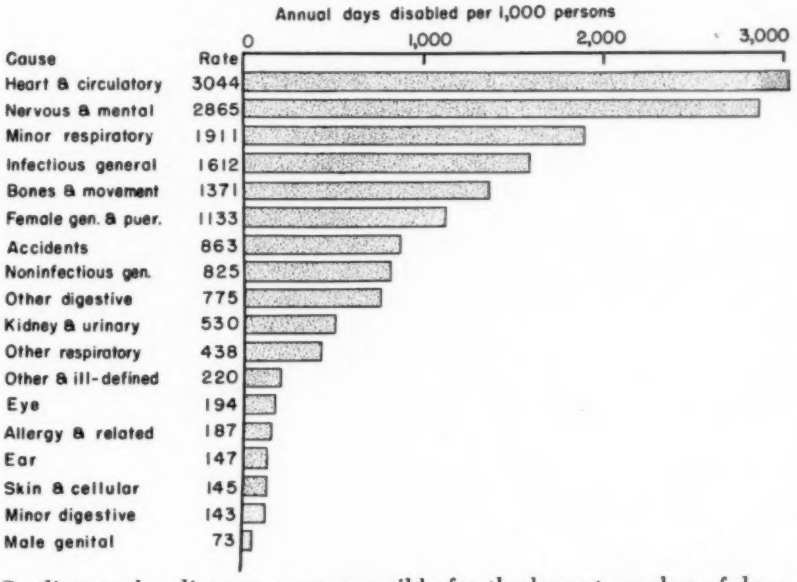
AFRI attack rates for all vaccination and age groups in the 1955 epidemic were slightly but significantly low among persons who had received type B adjuvant vaccines. Type B aqueous vaccines conferred no protection. One hundred forty-two strains of influenza B were isolated from AFRI occurring during the epidemic. No strains of influenza A had been isolated at any time in 1954 and 1955.

Increasing Life Expectancy



In 1950, the average length of life that could be expected at birth of a white child was about 70 years, up about 40 percent from expectancy in 1900. For a nonwhite child, the length of life expected was 60 years, up 80 percent from 1900. The great gains in length of life have resulted primarily from reduction of infant mortality and childhood diseases. (*PHM chart*)

Causes of Days of Disability



Cardiovascular diseases are responsible for the largest number of days of disability annually in the American population. These and nervous and mental diseases rank high because of their long duration. Minor respiratory diseases are a major cause of disability because of frequency. (*PHM chart*)

The laboratory, in addition to studying the reaction to the various vaccines during the epidemic, analyzed their effect according to the occurrence of AFRI before and after the epidemic and among persons residing in 112 households having one or more virus-positive illnesses. In these households, AFRI attack rates were significantly low in the total and consistently low in each study and age group among persons who received type B vaccines.

Field Trials Are Important In Testing New Vaccines

Field trials are essential in determining the value of new vaccines, stated Dr. W. Charles Cockburn, director of the Epidemiological Research Laboratory, Public Health Laboratory Service, London, England.

Statistical criteria for field studies of vaccines were set up nearly 50 years ago, Cockburn said, although actual trials at that time were unsatisfactory. In the past 20 years, however, these criteria have been used to evaluate pertussin, BCG, poliomyelitis, influenza, and other vaccines.

The early trials of a new vaccine indicate only that the particular lot used is effective under the test conditions, Cockburn pointed out. Then, after the effectiveness of a lot of vaccine has been established, a method of standardizing the antigenic potency of each batch must be devised. However, laboratory standardization of vaccine is difficult, he said, because it has not yet been determined that tests in laboratory animals give a direct measurement of the factor or factors necessary to protect man.

As many batches of vaccine as possible should be tested in the laboratory and in the field, and the laboratory test chosen for standardization should be one which shows good correlation with results of the field trials, Cockburn emphasized. However, the number of field trials that can be made depends on the number of cases of the disease, and unless the incidence of a disease is high, it is almost impossible to obtain conclusive evidence of correlation between the results of field trials and of laboratory evaluations, he stated.

In closing, Cockburn discussed the health officer's part in vaccine trials. The health officer must be "an unwearied observer that vaccines continue to be of good potency and that they are not provoking unpleasant sequelae," he said. Often the health officer's observations will only point to a problem that will require extensive research for its solution, he stated. "But the important observation is the preliminary one, and in preventive medicine, the health officer is in the best position to make it."

Life Table Applicable To Variety of Studies

The life table has many applications to health and population studies, according to Mortimer Spiegelman, Metropolitan Life Insurance Co., New York City.

Emphasizing its versatility, Spiegelman listed among its uses these: to compare health conditions of communities; to evaluate therapy and as an aid in prognosis; for studies of hospital data; to estimate incidence of certain morbid conditions; and for studies of marriage, population growth, and the labor force.

To introduce his subject, he distinguished between the generation life table, which is a record of a group or cohort covering the period from birth to the loss of the last life, and the current and projected life tables, which represent hypothetical situations.

The current life table is derived from the mortality rates according to age observed during a short calendar period among the many generations then in existence, he explained.

The projected life table is computed from projected rates of attrition by death.

Multiple decrement tables and select tables are specializations of the life table, according to Spiegelman.

In the multiple decrement table, he said, the column of the living and, consequently, other data are split into components on the basis of newly acquired characteristics or of changes in status. For example, in a cohort of females traced from birth, it is possible to distinguish between those who marry and those who remain single.

In the select table, rates of decrement are set down in a two-way classification, Spiegelman explained. One is duration since acquisition of a new characteristic or change in status; the other is usually attained age at time of acquisition or change. For example, rates of remarriage for the widowed may be shown in a select table on the basis of both age at widowhood and duration since the event.

Among examples of life table uses, Spiegelman mentioned analyses by causes of death. The distribution of life table deaths according to specific causes is the first step in computing the changes of ultimate death from such causes, he said. The desired result is obtained by summing the life table deaths from a specific cause after a stated age and dividing the total by the life table survivors to that age.

For studies of population problems, he mentioned the "net nuptiality" table (attrition by death and by marriage) and the "gross nuptiality" table (attrition by marriage alone), which he said can be used to calculate eventual chances of marriage and the effect of mortality on these chances.

Persons with chronic disease, Baltimore Eastern Health District morbidity study, June 1, 1938–May 31, 1943

	Study year					
	1st	2d	3d	4th	5th	All 5
Total persons with 1 or more chronic diseases [1]	936	1,009	1,016	581	556	4,098
Disabling chronics	399	405	376	217	177	1,574
Nondisabling chronics	537	604	640	364	379	2,524
Disabling chronic cases:						
Prior onset (in study, 1st visit)	293	218	200	109	105	925
Prior onset (moved into study)	24	36	31	13	9	113
New cases (onset within)	82	75	59	35	19	270
Newly disabled (from nondisabling)	------	76	86	60	44	266
Moved out (disabled this year)	39	47	38	14	23	161
Full-time years of observation as disabling chronics	390	355	329	184	162	1,420
Deaths from chronic disease	48	44	36	21	14	163
Annual deaths per 1,000 persons with disabling chronic diseases	123.1	123.9	109.4	114.1	86.4	114.8
Recovery [2] from disabling chronic diseases	3	3	5	------	2	13
Annual recoveries [2] per 1,000 persons with disabling chronic diseases	7.7	8.5	15.2	------	12.3	9.2
Deaths from nonchronic causes among persons with disabling chronic diseases	------	1	3	2	5	11
Annual nonchronic deaths per 1,000 persons with disabling chronic diseases	------	2.8	9.1	10.9	30.8	7.7
Nondisabling chronic cases:						
Prior onset (in study, 1st visit)	410	405	434	273	281	1,803
Prior onset (moved into study)	61	64	53	33	19	230
New cases (onset within)	66	48	47	23	10	194
Nondisabling this year (from disabling)	------	87	106	35	69	297
Moved out (nondisabling this year)	45	69	64	41	44	263
Full-time years of observation as nondisabling chronics	497	546	571	339	353	2,306
Recovery [2]	------	5	2	------	------	7
Annual recoveries [2] per 1,000 persons with nondisabling chronic diseases	------	9.2	3.5	------	------	3.0

[1] Includes persons in long-term institutions as well as those in short-term hospitals and those not in any hospital.

[2] "Recovery" means that the person became free of all chronic diseases.

Baltimore Morbidity Study Reports on Chronic Illness

Rates for disabling and nondisabling chronic illness in Baltimore's Eastern Health District increased 4.9 and 14 percent, respectively, within a 5-year period, according to Dr. Selwyn D. Collins and F. Ruth Phillips, of the Division of Public Health Methods, Public Health Service. Collins, in the W. Thurber Fales Lecture, described the methods used in, and the results of, a morbidity study in the district during the period June 1, 1938–May 31, 1943.

Apparently there are many more persons with a chronic disease or impairment that is not severe enough to interfere with their work than there are persons with a serious chronic disease that causes them to lose time from their regular activities, he stated. However, some of

the recorded rise in nondisabling chronic conditions may be caused by the patient's telling the interviewer that he still has a condition that he had reported earlier even though it might actually bother him very little, Collins explained.

Some persons in the study population who were not ill at the beginning of the study developed chronic conditions during the study period, some of them disabling and some nondisabling, Collins stated.

Full-time person-years of observation for all individuals, whether sick or not sick, totaled 21,505, Collins reported. For chronic diseases, days of disability totaled 219,857, or 10.2 days per person in the entire observed population. Thirty percent of the total days of disability were spent in bed; 70 percent of the total of 63,696 days in bed on account of chronic disease were spent in the hospital; and 71 percent of the 44,408 days in the hospital were spent in long-term hospitals for chronic diseases for periods of a year or more or as long as the patient remained under observation in the study.

Days of disability per chronic disabling case averaged 140; days in bed per chronic bed case, 65 days. Days per hospital case in both short-term and long-term hospitals averaged 102 days annually, including cases in institutions for a year or longer.

Summarizing the findings of the study, he reported 1,420 full-time years of observation of patients who had disabling chronic disease at some time during the study period, an annual death rate of 114.8 per 1,000 persons with disabling chronic disease, and a recovery rate of 9.2 per 1,000. Corresponding figures for patients with nondisabling chronic illness were 2,306 full-time years of observation and 3.0 recoveries.

Mental Health . . .

Foresees Future World Freed of Human Error

The renaissance of medicine and public health brings exciting prospects for alleviating the mental disorders of childhood and old age, according to Dr. Benjamin Pasamanick, director of research, Columbus (Ohio) State Institute of Psychiatry. Ready availability of funds and emergence of scientific method in medical and psychiatric education have stimulated researchers to intensive studies of causation.

New evidence for schizophrenia points to the probability of inborn errors of metabolism within the central nervous system, Pasamanick reported. Similar evidence holds hope for the manic-depressive psychoses, he added. Once the crack is made in the functional psychoses, and he believes it will come within 10 years, methods of therapy and prevention will follow swiftly, he said. Society is obligated to explore large-scale rehabilitation, he continued, long before thousands of patients return to the community.

In reviewing research progress, largely in his own institute, Pasamanick observed that diseases of hereditary origin no longer appear hopeless. Once the genetic mechanisms are delineated, these disorders will be easy to manage, either by prevention or direct manipulation of chemical constituents, he added.

In mental retardation, there is strong evidence of prenatal factors in organic etiology and sociocultural factors in psychological causes, Pasamanick continued. He described the isoimmunization hypothesis that some women harbor antigens from an infected fetal brain which may damage all future offspring. Research hopes to pave the way for "antibrain immunization" prior to each pregnancy, Pasamanick reported.

Lacking preventive techniques for disorders of reproductive casualty, ranging from cerebral palsy to accident proneness, today's best evidence lies in longitudinal studies of children born prematurely or to mothers subjected to complications of parturition, he said. Future research, with control of the many variables, should eventully pin down the relationship of early experience to function in later life, he believes.

Distinguishing between the difficulties in old age that are distinctly vascular phenomena and the disorders loosely called senility, Pasamanick said that, with nutritional improvement, better understanding of psychosocial stress, and expectations for some of the new drugs, deterioration and illness may be prevented or decreased to the point where happy noninstitutional life is possible.

Pasamanick ended his review with a discussion of possibilities in the distant future, predicting facetiously that such terms as emotion, motivation, maturity, anxiety, and thinking will be replaced in scientific terminology by a classification of physiological, chemical, and electrical correlates of behavior.

Pilot Program Expands Mental Nursing Services

A pilot program allowing public health nurses to offer supportive service to the families of mentally ill patients has been successful in Georgia since January 1953, said Dr. Guy V. Rice, Jr., director, health conservation services, Georgia Department of Public Health.

Followup studies since then have shown that the public health nurse performs this service well, and it is one that gives her a feeling of accomplishment. The family receives her assistance in times of crisis, and she can assist the family also in other areas within her jurisdiction.

The nurse can prepare the family to accept the patient's illness or help the patient take his place in the community when he is released from the hospital. Because the hospital is cooperating with the local health department, it receives valuable information about the patient and his family. Besides assisting the family and the hospital, the health department is a medical source to which other county officials may turn.

Several questions were raised by psychiatric and social work consultants before the program was begun. Was the public health nurse qualified to deal with mentally ill patients? They judged that, since the nurse would be giving the same kind of service that she gives to other patients and families, she would be qualified with proper orientation. Would the nurse be too apprehensive about mental illness to work effectively? It was found that initial fear was allayed after orientation at the State hospital and close supervision by the mental health consultant nurse during the first home visits.

Would the patient and his family resent the public health worker? In a few instances, the public health worker was resented, but most families were grateful and appreciative of the understanding and support given them by someone whom many of them already knew and respected.

Finally, was this a social work job? Much of the work done by the public health nurse could be broadly classified as social work, but the emphasis was on the nurse's professional role, Rice explained.

In order to make such a nursing service plan effective, he added, it is necessary to define objectives clearly, discuss the program fully with all personnel who provide this service to get full acceptance and cooperation, provide adequate orientation in the mental hospital setting, and employ a mental health consultant nurse and mental health worker on the health department staff to provide consultation and assist where necessary.

This supportive service should be an integral part of the local health department program, closely allied with the nursing service, he declared. The nurse should have assistance and advice from a psychiatrist, to whom she can also refer patients. And the hospital and public health and other State agencies should each understand the responsibilities, abilities, and limitations of the other, he concluded.

Baltimore Survey Finds 10 Percent Mentally Ill

Approximately 10 percent of a noninstitutional urban population are at one moment in time mentally ill, according to preliminary data developed from the illness survey in Baltimore by the Commission on Chronic Illness.

This information was reported by Dr. Pasamanick also in collaboration with Dr. Dean W. Roberts, executive director, National Society for Crippled Children and Adults; Dr. Paul V. Lemkau, director, New York City Community Mental Health Board; and Dean E. Krueger, Columbia University School of Public Health.

The estimate may be all too true for the country as a whole, and in any event warrants serious consideration, according to the authors. Baltimore, except for a large nonwhite population, is similar to other cities in family income and age distribution, they stated, adding that the nonwhite population (27 percent) tends to lower rates.

"We doubt very much that a population having more than this rate of mental illness, in addition to the heavy load of chronic and acute disease found in the Baltimore survey, could function as a society," the report asserted.

Only the psychoses, psychoneuroses, and psychophysiological autonomic and visceral disorders prevailing in a sample of 809 male and female patients of all ages, 86 of whom were diagnosed as mentally ill, are reported. Full details of the Baltimore survey, including hypothetical leads for further study, will be published by the Commonwealth Fund and the Harvard University Press. Some of the major findings follow:

- The psychoneuroses were 12 times as common as the psychoses, and the psychophysiological disorders were two-thirds as common as the neuroses.
- Male psychoses were twice as frequent as psychoses in women, but women had more psychoneurotic and psychophysiological disorders.
- The psychoses ranged from moderate to severe, or from interference with social and vocational adjustment to inability to function at premorbid levels.
- Impairment in patients with psychoneurotic and psychophysiological disorders either was insignificant or, at most, mild.
- The psychoses rose sharply with age, from no cases under age 15 to few only between ages 15 to 34, but from 5.8 cases per 1,000 population between ages 35 to 64 to the high rate of 27.8 at age 65 and over.
- Under age 15 and over age 64, no psychophysiological disorders were found, but in the young adult group (15 to 34) the number of cases was significantly more than in the middle ages (35 to 64).

Mental Hygiene Related To All Public Health

"The welfare of the mind and of the mental faculties belongs even more to the domain of public hygiene than the well-being of the other human functions because the mind is the principal link between the individual and society," avowed Dr. Benzion Liber, emeritus professor of psychiatry, New York Polyclinic Medical School.

The mind, more than the body, he said, must adjust itself to all circumstances of life, must give and take, must make concessions, must find its place among other minds.

The mind, while never rigidly differentiated from the body, is more delicate, and, reaching out into the world, it is our most exposed property. It is the most vulnerable part of a person and requires, in a sense, greater care than the body.

Mental hygiene should begin with the life of the normal, or almost normal, man and should attempt to teach him how to live so as to avoid mental illness or to check it in time, the psychiatrist said. It should study the causes of mental trouble in the individual. It should seek to discover the relationship between the personal mind and social life.

Speaking for the benefit of those public health workers and psychiatrists who may still be indifferent to the natural relationship between their areas of endeavor, Liber declared that the hygiene of the mind is destined to participate in all aspects of public hygiene: school hygiene, industrial hygiene, public hygiene of towns, cities, States, and countries, and even international hygiene.

If you are concerned with prenatal care, for example, it is not enough to know something about the pregnant woman's nutrition and the general hygiene of gestation, Liber said. You should also be familiar with the mental state common to women passing through that critical experience: their moods, their needs of sociability or isolation, of tranquility or entertainment.

Anyone interested in infant and child care, he continued, should be thoroughly informed concerning the regular development of intelligence, about the exceptional child, about the particularly gifted or talented, and about the effects of environment on the mental growth of children.

The public health worker in charge of school hygiene would do great injustice to his young clients if he were prepared to deal only with physical health. There is a special school psychology that influences the individual boy and girl, he said.

Liber proceeded to discuss similarly the need for recognition of the interdependence of mind and body in other health and social areas: child delinquency, crime, married life, industrial hygiene, social work, and health education, for example.

In all the subdivisions of public health work, one cannot help coming in contact with obstacles due to mental states of groups or of individuals, he said. Therefore, the public health worker must be well informed in mental hygiene and, to a certain extent, about mental disease as well, he concluded.

Mental Health Workshops Major Aid to Teachers

Educators are gaining insight into some basic principles of mental health through mental health workshops, according to Dr. Harriett B. Randall, assistant medical director of the Los Angeles City Board of Education.

Such a workshop, she said, was the 1949 pilot mental health workshop in Los Angeles sponsored by the California State Department of Public Health.

In planning the workshop for the Los Angeles city schools, it was possible to invite specialists from various parts of the country to work with the local staff and participants. The staff consisted of psychiatrists, psychologists, and educators.

Seventy-two participants were invited, representing all levels of education and special activities.

Workshop Pattern

Each workshop group had 12 members among whom were an administrator, elementary and secondary teacher, counselor, attendance supervisor, school physician, school nurse, and health coordinator. An educator, a psychologist, and a psychiatrist worked with each group.

The workshop lasted for 2 weeks. During the first period of each day a 1-hour basic lecture was given by a staff member. This lecture represented the topic for the day.

Topics were concerned with human behavior in infancy, early childhood, adolescence, and adulthood. Special topics covered mental hygiene problems in schools, pupils' emotional problems arising out of physical disabilities, and emotional and interpersonal relationship problems of school personnel.

General and group discussions, playlets, films, and panel discussions interspersed each day's activities.

The workshop was designed to evoke wholesome attitudes and responses in the participants, and brief, meaningful reports on the activities were submitted. These informal reports were incorporated into a mimeographed booklet, along with a statement of the workshop plan and purposes, abstracts of the 10 basic lectures given, and a list of reference materials.

The participants reported that the workshop had given them insight into personal problems and understanding of functional relationships among pupils, teachers, administrators, and school and community agencies. They learned techniques of parent-child counseling and gained perspective through meeting with all levels of school personnel. One of the most important effects was understanding of the principles of mental hygiene and the relationship between emotional growth and development and human behavior.

A followup meeting was held 6 months after the workshop. Many subsequent mental health workshops have followed the pattern of the original workshop.

Invaluable Aid

A survey of reactions to the workshop was conducted in the summer of 1956. Of the original 72 participants, 55 could be located, and they were sent questionnaires. Thirty-six responses were received. The respondents stated that the workshop had been of continuous benefit to them in their relationships with pupils, parents, and administrators. They found the workshop had increased their awareness of mental health. They were able to understand and aid the emotional

adjustment of their pupils, while increasing their own ability to handle individual classroom and administrative problems.

Of the 22 staff members queried, 11 replied to the questionnaire. They found the workshop an invaluable aid to understanding the problems of educators. Many said that they had learned a lot from the participants. Some said that teachers needed increased knowledge of mental health problems and hoped that educators could participate in further mental health workshop activities.

Reading Disabilities Studied As Clue to Other Conditions

Retardation of reading ability is very often associated with unfavorable environmental conditions or emotional problems, or both, in the child and his family according to preliminary findings reported by the Mental Health Study Center, National Institute of Mental Health, Public Health Service. Drs. Alan D. Miller, Joseph B. Margolin, and Stanley F. Yolles presented the center's findings.

Hoping to develop hypotheses concerning the effect of environment on reading ability and to use these hypotheses to work out a screening device which would be useful in determining the "type of soil in which related mental health problems take root," the authors are studying the reading disabilities among school children in Prince Georges County, Md.

The 2-year survey showed that reading disabilities were 1½ times greater among the children who were patients at the center than among the general school population and that more boys than girls were affected. None of the children included in this sample were mentally deficient.

Starting with the conjecture that a fairly limited disorder, such as reading disability, may be an indication of the presence of other disturbances, the initial survey showed that among all the children, ages 7 through 17, examined at the center since 1948, 27.2 percent presented some reading disorder: boys, 36.7 percent, and girls, 23.5 percent.

Children's interests, attitudes, general behavior, the impact of the family, school, and community on them, and the effect of their reading disabilities on their daily lives are being studied at the center. This report covers one phase of a study of the epidemiology of mental health and illness being conducted at the Mental Health Study Center.

Manpower and Brainpower . . .

Health Departments Lag In Sanitation Salaries

Competition by employers for qualified graduates is reflected in the first of five reports by the Committee on Salaries of the Conference of Municipal Public Health Engineers.

In this competition, health agencies fail by substantial margins to pay the going price for competent personnel in environmental services.

The committee surveyed the salaries of engineers, sanitarians, sanitary inspectors, veterinarians, sanitary directors, and other environmental health personnel in 371 full-time local health departments. In its report is shown the rise in salary levels from 1951 to 1956. Much of the information presented is based on a sample of 35 departments.

According to the report, salaries have been rising steadily at rates varying from 5 to 13 percent each year, but they do not match those paid in similar professional categories outside health departments.

Present salaries for engineers are well below those paid to other members of the profession. In 1952–54 the median salary was $1,000 below the median for county and municipal engineers and $2,400 below the median for all engineers. Under the circumstances, the number of vacant engineering positions in local health departments has tended to increase.

Starting salaries in health agencies for engineers with no experience in 1956 ranged from $4,250 to $4,650, but engineering schools predict that their 1957 graduates will expect around $5,250. In addition to paying higher salaries, private employers tell the young engineer that his interview and moving expenses will be paid, that he will receive an annual

Median maximum salaries of sanitarians and engineers in 371 local health departments by geographic area, 1956

Geographic area	Sanitarians	Engineers
Far west	$5, 614	$9, 000
Central	4, 870	7, 500
New England	4, 866	6, 750
Southwest	4, 631	7, 834
Middle east	4, 630	7, 250
Northwest	4, 449	7, 000
Southeast	3, 917	6, 725
United States	4, 776	7, 140

bonus, overtime pay, and free medical and hospital care.

Though the average top salary of the sanitarian has been rising more rapidly since 1954 than for any other salary group, the median salary since 1952 has been $2,000 or more below that of engineers in local health departments and approximately $750 below the median salary paid to male professional and technical workers in the United States.

Seven percent of the sanitarian positions studied were vacant. Thirty percent of these were available to college graduates with no experience, offering a starting salary of $4,479. Vacant positions for sanitarians offer higher salaries than filled ones. Among 675 filled positions with the same requirements the median starting salary was $4,347.

Members of the reporting committee are Walter A. Lyon, chairman, William T. Ballard, Herbert J. Dunsmore, Reinhart W. Koch, John W. Lemon, Eric W. Mood, Louis W. Pickles, Jack C. Rogers, and Lester A. Sanger.

Copies of the report may be obtained by writing to Walter A. Lyon, Philadelphia Department of Public Health, Room 630, City Hall Annex, Philadelphia 7, Pa.

New Training Opportunities Stressed in Pennsylvania

The Health Amendments Act passed by Congress in July 1956 "marks a tide that, taken on its full, will lead to signal new achievements" in the training of public health workers, declared Dr. Henry R. O'Brien of the Pennsylvania Department of Health.

Traineeships provided under title I and title II of this act are among the resources used in Pennsylvania to increase professional training of State and local health workers, O'Brien said. He urged all health officers to make definite plans for using the opportunities afforded by the act, in addition to all other training opportunities.

O'Brien described in detail Pennsylvania's progress in training health personnel since 1948, covering both organization and kinds of training.

Training, an activity found in every division of the health department, is stimulated and coordinated from one place, the division of professional training, he indicated. He considers this pattern the most satisfactory one.

The division of professional training, which O'Brien heads, is responsible for the Pittsburgh field training station. Set up in 1949 by the University of Pittsburgh, the Pittsburgh Department of Health, the State department of health, and the Public Health Service, this unit offers a number of formal and informal courses in various fields of public health.

The division also works closely with the program bureaus and divisions of the State health department, with the State tuberculosis and crippled children's hospitals, with educators in the city and county health departments, and with the universities on matters of education and training for health workers.

In the fall of 1956, the division was paying tuition for 6 workers enrolled full time in schools of public health and for 15 public health nurses studying full time, one from a visiting nurse association, O'Brien stated. In addition, the State department of health is aiding 166 State, county, city, and visiting nurse association nurses who are taking public health courses part time in 9 cities.

A feature of the program to which O'Brien called attention is a register of education and training, kept on 5" x 8" cards, for each of the health department's 900 or more professional and technical employees. Education and general experience before employment by the State and education or inservice training since then are listed. Such a register, he said, aids in planning training for an individual or a group.

Performance Budgeting Believed Oversold

Distinctions between performance reporting, performance budgeting, and program budgeting were delineated by Drs. Leon J. Taubenhaus, Brookline (Mass.) Health Department, Robert H. Hamlin, director of the department, and Robert C. Wood, assistant professor of government, Harvard Law School.

Stressing that these practices are not the "be-all, end-all" of administration, but valuable tools nevertheless, the authors indicated that health agencies will find the program budget, used in combination with performance reporting, best suited for program evaluation. The limited size of most health agencies, where not too many operations are routine, plus the intangible nature of health objectives tend to make measurement by the performance budget too difficult, they believe.

In performance reporting, all activities are reported in terms of work accomplished in a specific program. A nursing visit, for example, is reported according to the purpose for which it is performed: tuberculosis, communicable disease, school health followup, or some other typical health service. To be effective, performance reporting must coincide with the program budget, which emphasizes the cost of each program in relation to the total budget. The system must not be oriented to functional bureaus or divisions, they said.

In program budgeting, proposed expenditures are usually presented for salaries, supplies, and equipment. The program budget is merely the traditional line budget presented on a program rather than on a functional basis. Once established, each program budget is developed by the program head and requires little extra effort above that required to produce the annual budget.

Performance Budget

The performance budget has brought confusion to budget circles, especially in health agencies, the

authors indicated. The performance budget is basically cost accounting on a service unit basis, designed to test the efficiency with which individuals bring about a group accomplishment. Its focus is on "things to be done or accomplishments to be achieved rather than on things to be bought." The objects of expenditure are always arranged in terms of an end product, expressed as a work or service unit.

The service unit could be a patient examination in a clinic, in which the salaries of physician and nurse, or the cost of supplies and equipment, are prorated according to the number of patients seen. Or it could be a sanitary inspection where the inspector's wages, automobile expenses, and secretarial assistance are grouped together. A dollars-and-cents value is assigned.

Though the purpose of a group of actions in health planning can always be identified, as "X-rays completed," "reports filed," "tons of garbage collected," for example, the authors are convinced that it is not always possible to assign a real value to the service. When applied to tasks requiring professional skill and discretion, a unit cost is often as misleading as it is meaningless, they think. The methods they prefer are direct supervision, reporting, inspection, and a summary presentation of costs.

"We feel that it is more important to have knowledge of the total cost of a program, its percentage of the total budget, and an estimate of its accomplishment in terms of work done, than it is to know the cost of a unit of work as an estimate of efficiency or an illusion of value," they concluded.

Citizens Carry Forward Sanitation Projects

Sanitarians need not work alone in providing clean air, water, food, and shelter for the community; they have in the people an almost untapped resource to call upon, according to Robert E. Mytinger, of the Paper Cup and Container Institute.

Helping people to do things for themselves is based on two principles, he said. People learn by doing, and the decisions they make usually seem more important to them than decisions that are imposed on them.

Mytinger cited several examples of community action that have supported the sanitarian's efforts.

In Georgia, sanitarians in the Macon-Bibb-Jones County Health Department developed five measures in 1955 with the aid of interested citizens.

First was the passage of a bond issue for the construction of a sewage treatment plant, principally because of the interest and activity of the Macon Chamber of Commerce, the Macon Area Industrial Development Commission, and the National Council for Stream Improvement.

Second, a committee of realtors helped obtain legal support for a five-point housing redevelopment program.

Third was the creation of a county planning and zoning commission.

Fourth, a nursing home committee was formed to help guide sanitation practices in nursing homes.

And finally, through the active assistance of local garden clubs, the sanitarians saw the beginning of the end of open garbage dumps in the Macon area.

The Tulsa City-County Health Department in Oklahoma found that it paid to get the Tulsa Restaurant Association interested in restaurant sanitation.

Without funds to hire someone to organize a food sanitation training program, the department took the problem to the local restaurant association, where a special committee was appointed to investigate the needs and possible solutions.

The result was a recommendation for a sufficient increase in local licensing fees to permit addition of the new health department staff member. Furthermore, the group endorsed a plan requiring all food workers in Tulsa to take a written examination in connection with the training program. In the first 9 months of operation, 3,600 food handlers qualified.

Mytinger named five categories of potential value to the health worker: official government agencies; voluntary health groups; civic, fraternal, and religious organizations; coordinating agencies, such as a health council or federation of civic or business organizations; and unaffiliated citizens.

World Health . . .

World Health Body Comes of Age

The Ninth World Health Assembly set a new mark in the mature quality of its deliberations and statesmanship, declared Dr. Leonard A. Scheele in an address before the National Citizens Committee for the World Health Organization. Dr. Scheele is president of the Warner-Chilcott Laboratories, and former Surgeon General of the Public Health Service. Among the speakers following Scheele on the program were Drs. Gunnar Gundersen, D. J. Pletsch, and N. S. Scrimshaw.

Dr. Scheele stated that in contrast with other World Health Assemblies in which a charged atmosphere surrounded some issues and blocked truly decisive action, the 1956 meeting dealt with such problems effectively after calm deliberation.

The regular budget, long subject to pressure for substantial increases, was set at $10,700,000 for 1957, an

increase of $500,000 over the 1956 figure, showing the acceptance of the principal of orderly growth.

Reasonable solutions were found for such thorny problems as the relationship between the Pan American Sanitary Bureau and WHO, equitable geographic distribution of seats on the Executive Board and offices in the assembly, the participation of inactive members, and meetings of the Eastern Mediterranean Regional Committee. Scheele noted also that a better understanding of fellow members' problems has evolved in the process of working together.

Assembly discussion of the 1957 program showed a shift from the usual heavy emphasis on communicable diseases to other problems such as heart disease, health aspects of atomic energy, vital statistics, and other WHO services. There was also less stress on professional and technical training. According to Scheele, the discussions reflected smooth cooperation and planning within regional groups. These are all signs of maturity and strength, he said.

Resolutions and Recommendations

The drive for malaria eradication was confirmed as a central objective for the immediate future. At the same time, delegates called for emphasis by WHO on rheumatic, hypertensive, and coronary diseases. Following a challenging debate, he said, the assembly approved WHO's atomic energy program, which includes training of public health personnel; development of standards; and studies on effects of somatic and genetic injury, and on radioactive waste disposal.

The assembly also recommended that the governments of the world maintain close contact with public health authorities at all stages of work on atomic energy projects.

Discussions on radioactive waste pollution of the air, soil, and water produced requests for studies of international streams, and recommendations for cooperative studies by WHO and the Food and Agriculture Organization to determine the effects of radiation on plants and animals used for food.

One of the highlights of the debate on the International Atomic Energy Agency was the statement by an American delegate urging the new international organization to transfer all its public health activities to WHO in order to benefit from the health agency's 10 years of operating experience.

In preparation for WHO's 10th anniversary celebration in 1958, the 9th assembly called on each member to report on its health situation during 1954–56. Subsequently, he said, all reports will be coordinated into a comprehensive report on world health conditions.

Scheele stated that a resolution accepting Morocco, Sudan, and Tunisia as full members, and the Gold Coast, Nigeria, and Sierra Leone as associate members raised the total number of member states to 88. Attending the 9th assembly were delegates from 73 full member states and 4 associate members.

Technical Discussions

Twenty-one delegations included a nurse, reflecting the theme of the 1956 technical discussions, "Nurses: Their Education and Their Role in Health Programs." He explained that these discussions constitute an unofficial activity accompanying each assembly. Pearl McIver, chief of public health nursing, Public Health Service, directed preparations for the discussions, at the close of which a final report was presented to the assembly.

Directly stemming from these talks was Iran's first conference on nursing, and, in Scheele's opinion, the discussions may well furnish the momentum in many countries for the creation of a nursing service in harmony with the needs, resources, and mores of the individual society.

The World Health Assembly has grown to be the foremost public health meeting in the world, stated Scheele, and during this development it has demonstrated that nations varying widely in size, race, and culture can work together in harmony, with patience and wisdom.

Proposes New Style Medical Education

Medicine is no ivory-tower profession, insulated from world affairs, said Dr. Gunnar Gundersen, chairman of the Board of Trustees of the American Medical Association. More than ever before, it is one of the vital functions of modern civilization.

The dramatic political and economic events of the last 30 years, a period also of striking advances in technology and communications, have sharpened public interest in world affairs. Scientific gains in medicine have multiplied during the same period, he stated, and through international cooperation, the ultimate in knowledge and techniques are steadily spread over the globe. Individual physicians, medical associations and journals, and international health organizations have contributed to the heartening progress in world disease prevention, nutrition, and medical care.

Spectacular developments in medicine have stimulated mounting public interest in medical care, he said, especially in its socioeconomic aspects. As an expression of that interest he cited the striking growth of voluntary health insurance. Health and medical care are the subjects of more and more social, economic, and political proposals. They are also recognized as important contributors to world peace and stability.

As Gundersen sees it, "the dilemma facing today's physician is this: at the very time that medicine is becoming more difficult to master and keep up with, he must also expand his field of interest and action—both as physician and citizen." Fortunately, there are organizations through which the physician can speak and act.

On the international level, the

World Medical Association, composed of the national medical associations in 50 countries, and the World Health Organization maintain close liaison with one another to coordinate the best in world health efforts. These two organizations, Gundersen added, strive for mutual understanding between those in government health work and those in private practice. Their area of closest cooperation is the field of medical education. This, said Gundersen, needs to be specially geared to fit the expanding role of the modern physician.

In 1953, at the First Conference on Medical Education, sponsored by the World Medical Association, speakers emphasized repeatedly the need for better general education of potential physicians. The findings of that conference will be reviewed and correlated at the Second World Conference on Medical Education to be held in 1959 in Chicago.

In addition to medical education, he said, another vital consideration for physicians is the urgency of protecting the ethics, traditions, standards, and freedom of medical practice. Towards this purpose, the WMA adopted an International Code of Medical Ethics and a modified Hippocratic Oath known as the Declaration of Geneva. The association has also set up social security principles to protect the freedom of both the physician and the patient, Gundersen stated.

Malaria Eradication Demands Able Men

Thirteen out of the sixteen countries in the Americas with malaria projects at the beginning of 1955, had converted from control to the technically sounder eradication policy by September 1956, reported Dr. Donald J. Pletsch, chief technical adviser of the WHO Malaria Team in Mexico. Of 10 territories, 8 had converted by the same date.

Reviewing the steps leading to adoption of the global eradication concept, he stated that the danger of anopheline resistance to insecticides was first pointed out at the 14th Pan American Sanitary Conference at Santiago, Chile, in 1954. He then recalled the gravity of a presentation by Indonesian experts at the Second Asian Malaria Conference in Baguio, Philippines, in 1954, in which they demonstrated the nonsusceptibility of *Anopheles sundaicus* to residual applications of DDT. The Eighth World Health Assembly committed WHO to worldwide eradication, and on the recommendation of the UNICEF-WHO Joint Committee on Health Policy, UNICEF gave first priority to malaria eradication.

A number of countries have assumed the temporarily high cost of eradication, said Pletsch. The UNICEF forecast of commitments averages $8,750,000 for malaria out of a total budget of $25,835,000 annually for the next 3 years. An allocation of $1,500,000 for malaria eradication work in 1957 was made by the United States for a special hemisphere account administered by the Pan American Sanitary Bureau.

Plans and financial allotments alone cannot guarantee eradication, he said. The ablest men in this field must be mobilized and wisely used. At this point he presented an estimate prepared by Dr. E. J. Pampana, chief of the Malaria Section of WHO, listing by category the number of specialists needed for every million persons to be protected in any program.

To illustrate how personnel, time, and effort can best be utilized, Pletsch cited experiences from work in Taiwan and Mexico. The guiding principles were adaptation and simplification, he said.

According to the Pampana formula, Taiwan's 5½ million persons in malarious areas required 110 mechanic-drivers. Because the island is too small for extensive use of motor vehicles, however, each sprayman used his own bicycle, and squad equipment was divided among the squad members. Only 9 vehicles were used for the malaria service, and of these only 5 were normally driven by a mechanic-driver.

The Mexican malaria service has only five professional entomologists for the 16 million people in malarious areas, he said, pointing out that the entomologists in Mexico's 14 zones are actually technicians working under instructions of professional entomologists in Mexico City.

The effectiveness of simplicity and ingenuity when combined with administrative ability was demonstrated by an industrial chemist in charge of a DDT powder plant in Taiwan. To fulfill a request for more than 500 tons of DDT per year, he personally took a Chinese Navy ship to the beaches of Okinawa and brought back a shipload of surplus machinery. In his machine shop, he transformed the material into condensers and jet mills which were used to produce DDT according to the most rigid WHO standards.

In Taiwan, the gravimetric measurement of each sprayer charge of insecticide was facilitated by the general use of the Roman balance or individual beam weighing scale on that island. In Mexico, however, no adequate portable scale or balance was in common use. Measurement was originally made by volume, said Pletsch, until the resulting inaccuracies (up to 20 percent) were pointed out. Efforts by international staff members then produced a simple Roman balance, patterned after the Taiwan model, for weighing 300 grams or 670 grams of insecticides.

Such exchanges of ideas, concluded Pletsch, can overcome graver problems inevitable in the global struggle against malaria.

Links Malnutrition, Child Mortality

Malnutrition is a leading cause of death among children in Latin America, even though mortality statistics for the area show diarrheal diseases to be the principal cause, with malnutrition far down the list.

This fact was brought out by Dr. Nevin S. Scrimshaw, regional adviser in nutrition with the Pan American Sanitary Bureau, and director of the Institute of Nutrition of Central America and Panama. He explained that in most Latin American countries deaths are not medically certified; registry is based on information from the family or from family friends.

To determine the true cause of death among children in rural Guatemala, the Institute of Nutrition of Central America and Panama with the assistance of WHO consultants arranged for visits to the families immediately after deaths were reported. INCAP is a cooperative institute organized by the Central American countries and administered by the Pan American Sanitary Bureau, said Scrimshaw.

A study of four representative highland villages showed that two-thirds of all children between the ages of 1 to 5, whose death reports listed diarrhea or parasites, actually died of severe protein malnutrition.

Scrimshaw reported the following steps toward the solution of major nutritional problems, achieved by WHO despite limited personnel and budget.

Endemic Goiter

Endemic goiter was recognized to be a major public health problem in all of Latin America after the visit in 1950 of a WHO consultant who trained workers in a number of countries in endemic goiter diagnostic techniques. Reports since then show that in Peru 36 percent of the men and 64 percent of the women have goiter, and in Panama 47 percent of the adults in certain provinces are affected. Figures for Colombia indicate endemic goiter for 57 percent of the total population; for Guatemala an average of 38 percent; and for El Salvador, Honduras, and Nicaragua nearly 30 percent. In many of these countries cretinism has been reported along with deaf-mutism and feeble-mindedness, conditions prevalent in goitrous areas.

The problem of iodine deficiency in these areas was solved by Dr. Frederick Clements, former chief of WHO's nutrition section who spurred the development of procedures for adding iodine to the crude, moist salt used locally. The iodization process used in the United States was inappropriate because it requires that the salt be refined and dry. With potassium iodate added to salt, the average incidence of goiter fell by 42 percent in 15 weeks in a trial on school children in El Salvador, and 65 percent in 25 weeks in a similar group in Guatemala.

In 1955, two WHO consultants assisted all of the Latin American countries in drawing up regulations for salt iodization and in obtaining the appropriate machinery and supplies. Such measures are expected to eliminate endemic goiter as a public health problem from the countries served, in the next few years.

Kwashiorkor

A tragic aspect of kwashiorkor, a disease most often developing from the lack of good quality protein in the diet of children, is that parents usually mistake its symptoms for those of worm infection. As a result, the little solid food the child receives may be replaced by soft, starchy gruels almost devoid of proteins. Affected children, therefore, often do not reach the hospital, and of those who do, 10 to 30 percent die despite the best of treatment.

Most children who survive the disease do not receive enough protein nourishment for normal growth, as shown in surveys of poor urban and rural areas. The belief that children in underdeveloped countries are small in stature and build because their parents are small is false. Central American children grow satisfactorily until after they are weaned and no longer have mother's milk as a source of protein; it is their almost stationary development during preschool years which accounts for the loss in overall growth. From this great reservoir of malnourished preschool children come most cases of kwashiorkor.

Since 1950, when consultants from WHO and FAO collaborated to define the precise nature of kwashiorkor and reported its wide incidence in Africa, a number of studies have been made by consultants of these organizations in Central and South America and by Latin American workers. Stimulated by these studies, research was conducted elsewhere with the result that almost all underdeveloped countries report severe protein deficiency.

It was found that in meeting the need for more protein in underdeveloped areas, increased output of cow's milk and other animal proteins had to be ruled out for agricultural and economic reasons. Fish or vegetable protein of good quality was the practical answer. Pilot efforts in Africa, India, and Central America were sponsored by WHO toward this end. In Central America, a tasty mixture has been devised and has proved to be of such satisfactory quality protein that it is not improved significantly by the addition of milk. It is intended as a food supplement but it is more complete nutritionally than milk itself and less than half the price.

In a common effort to overcome protein malnutrition, WHO is also actively supporting educational efforts against food practices responsible for kwashiorkor; FAO is helping to improve production of animal protein; and UNICEF is distributing and conserving milk as well as supporting the development of vegetable protein combinations.

WHO also provides the stimulus for work on nutritional anemia, pellagra, beriberi, diabetes, and nutritional disorders of the eye; and promotes anthropometric and biochemical measures for the evaluation of nutritional status. A new WHO activity is the study of ischemic or coronary heart disease.

The lower income groups in a number of countries are almost free of coronary heart disease, while in

the upper income groups of most lands and in the United States and western Europe, it is a leading cause of death. These differences were first attributed to poor statistics but it is now apparent that they are real. The comparison of nearly 1,000 aortas from Guatemala and New Orleans has recently shown that complications of atherosclerosis develop 20 to 30 years of age earlier in the New Orleans group than in Guatemala. These differences parallel those in diet and in way of life; they are not explained by racial factors. A WHO study group met in Geneva in November 1956 to cover ischemic heart disease, and a second meeting is planned for 1958.

Nutritional deficiencies account for a growing proportion of the total public health problem, as infectious and insect-borne disease control succeeds, Scrimshaw concluded.

Public Health Traineeships for 1957–58

Applications for traineeships in the new public health training program are being accepted for the 1957–58 academic year. Voted by Congress on July 23, 1956, the 3-year program supplies funds to professional health personnel for graduate or specialized training in public health.

More than 330 traineeships have been awarded through the $1 million appropriation provided for the program's first year. In addition to tuition and fees, stipends cover living expenses for the trainee and legal dependents.

In December 1956, an 11-member advisory committee was set up to assist in planning the prorgam. The members are:

Dr. Franklyn B. Amos, director, office of professional training, New York State Department of Health; Dr. Philip E. Blackerby, Jr., associate general director and director of division of dentistry, W. L. Kellogg Foundation, Battle Creek, Mich.; Robert M. Brown, chief, bureau of environmental hygiene, Maryland State Department of Health; Dr. Rolf Eliassen, professor of sanitary engineering, Massachusetts Institute of Technology.

Miss Roberta E. Foote, director, public health nursing services, The Kansas State Board of Health; Dr. Ruth Freeman, associate professor of public health administration, School of Hygiene and Public Health, Johns Hopkins University; Dr. Hugh Hussey, professor of medicine, Georgetown University School of Medicine, and director of the department of medicine, and physician-in-chief of Georgetown University Hospital.

S. S. Lifson, director of health education, National Tuberculosis Association; Dr. Malcolm H. Merrill, director of public health, California State Department of Health; Miss Marian I. Murphy, professor of public health nursing, University of Minnesota; and Dr. W. L. Treuting, acting chairman, department of tropical medicine and public health, School of Medicine, Tulane University.

Applications for traineeships, which are available from the Division of General Health Services, Bureau of State Services, Public Health Service, should be submitted by April 1, 1957, if possible.

Milk Sanitation Honor Roll for 1955–56

Seventy-three communities have been added to the Public Health Service milk sanitation "honor roll," and 78 communities on the previous list have been dropped. This revision covers the period from January 1, 1955, to December 31, 1956, and includes a total of 235 cities and 50 counties.

Communities on the "honor roll" have complied substantially with the various items of sanitation contained in the milk ordinance suggested by the U. S. Public Health Service. The State milk sanitation authorities concerned report this compliance to the Public Health Service. The rating of 90 percent or more, which is necessary for inclusion on the list, is computed from the weighted average of the percentages of compliance. Separate lists are compiled for communities in which all market milk sold is pasteurized and for those in which both raw milk and pasteurized milk is sold.

The suggested milk ordinance, on which the milk sanitation ratings are based, is now in effect through voluntary adoption in 436 counties and 1,620 municipalities. The ordinance also serves as the basis for the regulations of 34 States and 2 Territories. In 11 States and the 2 Territories it is in effect statewide.

The ratings do not represent a complete measure of safety, but they do indicate how closely a community's milk supply conforms with the standards for grade A milk as stated in the suggested ordinance. High-grade pasteurized milk is safer than high-grade raw milk because of the added protection of pasteurization. The second list, therefore, shows the percentage of pasteurized milk sold in a community which also permits the sale of raw milk.

Although semiannual publication of the list is intended to encourage communities operating under the suggested ordinance to attain and maintain a high level of enforcement of its provisions, no comparison is intended with communities operating under other milk ordinances. Some communities might be deserving of inclusion, but they cannot be listed because no arrangements have been made for determination of their ratings by the State milk sanitation authority concerned. In other cases, the ratings which were submitted have lapsed because they were more than 2 years old. Still other communities, some of which may have high-grade milk supplies, have indicated no desire for rating or inclusion on this list.

This compilation is from the Division of Sanitary Engineering Services of the Bureau of State Services, Public Health Service. The previous listing, with a summary of rules under which a community is included, was published in Public Health Reports, September 1956, pp. 947–950. The rating method was described in Public Health Reports 53: 1386 (1938). Reprint No. 1970.

Communities awarded milk sanitation ratings of 90 percent or more, 1955–56

100 PERCENT OF MARKET MILK PASTEURIZED

Community	*Date of rating*
Arizona	
Phoenix	11–21–1955
Colorado	
Boulder County	12–14–1956
Colorado Springs	1–19–1956
Denver	10–28–1955
Pueblo County	2– 2–1956
District of Columbia	
Washington	3–12–1959
Georgia	
Albany	5–24–1956
Athens-Clarke County	4– 8–1955
Atlanta	10–28–1955
Augusta-Richmond County	11– 9–1956
Bainbridge	1–19–1956
Baxley	8– 4–1956
Cairo	2–25–1955
Calhoun, Gordon County	9– 7–1956
Georgia—Continued	
Camilla	9– 9–1955
Columbus	2–17–1955
Dalton, Whitfield County	9– 9–1955
Douglas	6–14–1956
Dublin	3–18–1955
La Grange	12–16–1955
Moultrie	11– 4–1955
Quitman	8–25–1955

Communities awarded milk sanitation ratings of 90 percent or more, 1955–56—Continued

100 PERCENT OF MARKET MILK PASTEURIZED

Community	Date of rating
Georgia—Continued	
Savannah, Chatham County	9–25–1956
Valdosta	4–18–1956
Waycross	8–30–1956
Idaho	
Idaho Falls	6–13–1956
Illinois	
Chicago	6–28–1955
Indiana	
Anderson	6– 9–1955
Brazil	12–21–1955
Calumet region	5–26–1955
East Chicago	
Gary	
Hammond	
Crawfordsville	4–20–1955
Elkhart, Goshen, Nappanee area	1–11–1956
Greencastle	1– 4–1956
Indianapolis and Marion County	8–13–1956
La Fayette	9– 7–1956
Lake County	5–1955
Crown Point	
Highland	
Hobart	
La Porte	5–25–1956
Madison	8–1955
Monticello	12– 6–1955
Peru	2–1955
Salem	6–28–1956
South Bend	3– 8–1956
Terre Haute	2– 3–1955
Vincennes	3– 7–1955
Kentucky	
Anderson County	5–17–1956
Bardstown	3–1955
Benton	6– 7–1956
Bowling Green	11–17–1955
Breckenridge County	5–31–1956
Cadiz	10– 5–1956
Campbellsville	4– 8–1955
Eddyville	6– 5–1956
Falmouth	4–26–1956
Frankfort	7–23–1955
Fulton	12–23–1955
Georgetown	10–16–1956
Greenville	6– 6–1956
Hardinsburg	5–31–1956
Hopkinsville	11–17–1955
Lawrenceburg	5–17–1956
Kentucky—Continued	
Liberty	10–11–1956
Louisville and Jefferson County	4–19–1956
Mayfield	9–16–1955
Monticello	7–20–1956
Morgantown	6– 5–1956
Murray	3–16–1956
Newport and Campbell County	10–20–1955
Owensboro	5–17–1956
Paducah	8– 5–1955
Paris and Bourbon County	5– 3–1956
Smithland	6– 6–1956
Spencer County	4–19–1956
Stanford	12– 2–1955
Trigg County	10– 5–1956
Union County	5– 7–1956
Mississippi	
Columbus	9–19–1956
Eupora	2–23–1956
Greenwood	4–25–1956
Grenada	11–15–1955
Houston	6– 1–1955
Iuka	7–19–1955
Kosciusko	8–10–1955
Laurel	7–12–1956
McComb	8– 2–1956
Meridian	6–18–1956
New Albany	1–18–1956
Oxford	12–14–1955
Picayune	11– 4–1955
Starkville	3–26–1956
West Point	5–26–1955
Missouri	
St. Joseph	6– 9–1955
St. Louis	11–28–1955
Nevada	
Ely, McGill, and Ruth	4–19–1955
Yerington	11–21–1955
North Carolina	
Beaufort County	3–31–1955
Bertie County	3–31–1955
Bladen County	6– 6–1955
Camden County	7– 5–1956
Charlotte	5– 7–1956
Chatham County	4– 5–1955
Chowan County	7– 5–1956
Craven County	1–20–1956
Cumberland County	3–16–1956
North Carolina—Continued	
Durham County	8– 7–1956
Edgecombe County	10– 5–1956
Forsyth County	1–31–1955
Guilford County	9–26–1956
Halifax County	2–16–1956
Lee County	4– 8–1955
Lenoir County	1– 7–1955
New Hanover County	5–24–1956
Onslow County	5–16–1955
Orange County	4– 5–1955
Pasquotank County	7– 5–1956
Pender County	5–16–1955
Perquimans County	7– 5–1956
Person County	4– 5–1955
Pitt County	4–20–1955
Sampson County	8–27–1956
Scotland County	5–30–1956
Tyrrell County	8– 5–1955
Washington County	8– 5–1955
Wilson County	10–18–1955
Oklahoma	
Ardmore	4–13–1956
Bartlesville	3– 8–1955
Guthrie	5–22–1956
Mangum	10–27–1955
Okmulgee	5– 8–1956
Sulphur	2– 9–1956
Tahlequah	5– 1–1956
Tulsa	5–23–1956
Tennessee	
Bristol	11– 3–1955
Clarksville	2–10–1955
Clinton	5–29–1956
Columbia	6– 7–1956
Cookeville	9–21–1955
Elizabethton	2–23–1955
Fayetteville	6– 7–1956
Franklin	5– 3–1956
Greeneville	6–19–1956
Humboldt	6–19–1956
Jackson	6–20–1956
Jefferson City	8–20–1956
Kingsport	11– 9–1955
Knoxville	8–26–1955
Lewisburg	11–21–1955
Livingston	6– 8–1956
Loudon	5–24–1956
Manchester	10–12–1956
Memphis	6–29–1955
Milan	6–19–1956
Morristown	8–20–1956
Murfreesboro	7–14–1955

Communities awarded milk sanitation ratings of 90 percent or more, 1955–56—Continued

100 PERCENT OF MARKET MILK PASTEURIZED

Community	Date of rating
Tennessee—Continued	
Nashville and Davidson County	10–27–1955
Paris	11–17–1956
Pulaski	9– 1–1955
Rogersville	11– 7–1955
Shelbyville	5–17–1956
Sparta	5–16–1956
Springfield	7–23–1955
Tullahoma	10– 9–1956
Texas	
Beaumont	5–24–1955
Brownfield	5– 6–1955
Burkburnett	8–16–1955
Cleburne	3–13–1956
Corpus Christi	7–26–1955
Edinburg	11–21–1955
El Paso	10–25–1955
Falfurrias	6–22–1956
Harlingen	6–14–1956
Houston	5–24–1956
Jacksonville	6– 7–1956
Lufkin	3– 3–1955
Midland	1–21–1955
Odessa	1–21–1955
Orange	5–19–1955
Texas—Continued	
Plainview	6– 2–1956
San Antonio	2– 8–1955
San Benito	6–14–1956
Texarkana	3– 9–1956
Vernon	10–26–1955
Wichita Falls	1–10–1956
Utah	
Ogden	10–18–1955
Salt Lake City	2–10–1956
Virginia	
Blacksburg	8–16–1956
Bristol	11– 3–1955
Buena Vista	10–28–1955
Christiansburg	8–16–1956
Front Royal	11–10–1955
Glasgow	10–28–1955
Lexington	10–28–1955
Luray	11–11–1955
Marion	11–29–1956
Norfolk	6– 1–1956
Pulaski	8–17–1956
Radford	8–15–1956
Richmond	4– 6–1956
Roanoke	6–1956
Virginia—Continued	
South Boston	4–13–1956
Staunton	7–10–1956
Williamsburg	10–25–1955
Washington	
Spokane	10–24–1956
Wisconsin	
Ashland	10–10–1956
Baraboo	10–18–1955
Beaver Dam	3–29–1955
Beloit	12–20–1955
Dodgeville	5–21–1956
Green Bay	10– 6–1955
Janesville	11–23–1955
Kenosha	7–14–1955
La Crosse	1–14–1955
Madison	11–18–1955
Manitowoc	5–11–1955
Milwaukee	6– 8–1956
Oshkosh	7–11–1956
Racine	7–12–1956
Ripon	3–29–1955
Sheboygan	7– 7–1955
Waupun	3–29–1955

BOTH RAW AND PASTEURIZED MARKET MILK

Community and percent of milk pasteurized	Date of rating
Georgia	
Carroll County, 97.5	3–24–1955
Cartersville, 97.7	1–26–1955
Gainesville-Hall County, 92.1	5–20–1955
Macon, 99.7	6–23–1955
Marietta, 97.8	10–26–1956
Newnan, 95	5– 3–1956
Pelham, 94	9– 7–1955
Thomaston, 91.5	5– 3–1956
Washington, 99.7	11–18–1955
Winder-Barrow County, 98.5	3–10–1955
Kentucky	
Lexington and Fayette County, 99	9–13–1956
Kentucky—Continued	
Princeton, 96	5–19–1955
Somerset, 95	2– 7–1955
Missouri	
Joplin 97.5	9– 8–1955
Moberly, 94.2	3– 1–1955
Poplar Bluff, 97.4	8–18–1955
North Carolina	
Cleveland County, 89.9	9–10–1956
Oklahoma	
Altus, 94.2	5– 5–1955
Elk City, 99	4–30–1956
Enid, 98	5– 5–1955
Henryetta, 80.7	4–17–1956
Oklahoma—Continued	
Lawton, 99.2	12–20–1955
McAlester, 84	7–18–1956
Muskogee, 97.6	12–15–1955
Norman, 99	1–16–1956
Oklahoma City, 98	11– 9–1956
Ponca City, 96.6	4–18–1956
Shawnee, 98.8	11–18–1955
Oregon	
Portland, 99.4	7–30–1955
Tennessee	
Harriman, 96.2	12– 7–1955
Kingston, 87.1	11–21–1955
McMinnville, 98.3	5–15–1956

BOTH RAW AND PASTEURIZED MARKET MILK—Continued

Community and percent of milk pasteurized	*Date of rating*	*Community and percent of milk pasteurized*	*Date of rating*	*Community and percent of milk pasteurized*	*Date of rating*
Texas		*Texas*—Continued		*Texas*—Continued	
Amarillo, 99.3	4–11–1955	Lubbock, 99.4	6–14–1956	Seminole, 93.9	5–11–1955
Brenham, 94	6–13–1956	McAllen, 99.2	11–21–1955	Waco, 99.76	3–19–1956
Brownsville, 98.3	6–28–1956	Mercedes, 99	11–21–1955		
Childress, 83.4	4–22–1955	Paris, 98	2– 2–1956	*Virginia*	
Fort Worth, 99.98	2–29–1956	San Angelo, 99.7	9– 1–1955	Charlottesville, 99.4	10–17–1955

NOTE: In these communities the pasteurized market milk shows a 90 percent or more compliance with the grade A pasteurized milk requirements, and the raw market milk shows a 90 percent or more compliance with the grade A raw milk requirements, of the milk ordinance suggested by the United States Public Health Service.

Note particularly the percentage of the milk pasteurized in the various communities listed. This percentage is an important factor to consider in estimating the safety of a city's milk supply. All milk should be pasteurized, either commercially or at home, before it is consumed.

Training in Bioassay of Polluted Waters

A training course in the use of aquatic organisms for measuring and interpreting water pollution will be held May 6–10, at the Robert A. Taft Sanitary Engineering Center in Cincinnati, Ohio. It will be followed on May 13 and 14 by a training course in the bioassay of toxic wastes.

The biology of polluted waters course features basic instruction in the nature of various organisms and their response to pollution. The lectures, discussions, and laboratory demonstrations will emphasize new information and new applications and interpretations of data now in use. Professional and technical personnel dealing with aquatic biology are eligible for enrollment.

The course in the bioassay of toxic wastes deals with the effects of the steadily growing quantity, variety, and complexity of wastes on fish and other organisms. Study of these effects often opens the way for evaluation of toxicity so that suitable management practices may be instituted, even if the precise composition of the waste is unknown.

Trainees completing the course will be prepared to set up and run a basic bioassay program.

Applications and further information on both courses may be requested from Harry P. Kramer, Chief of Training Program, Robert A. Taft Sanitary Engineering Center, Public Health Service, Cincinnati 26, Ohio.

Patients in Nursing Homes and Their Care

NURSING HOMES have emerged to fill a particular set of needs. As they exist today, they respond as much to social needs as to medical needs. The impelling problem is that of accommodating and caring for people who require personal and nursing attention not forthcoming in their own homes or in the homes of relatives. Sometimes this entails a type of care which can be given properly only by trained personnel operating in a special facility such as the nursing home. Sometimes the care required is of a sort which might be possible in one's own home but is not feasible for the particular family or is simply not the desired arrangement. The sheer medical needs for a certain type of care have been reinforced by many physical and social pressures in contemporary life to produce the specialized institution known as the nursing home.

As a relatively new type of facility, the nursing home is not yet clearly conceived and understood. Need for better understanding the role of the nursing home and similar facilities in caring for the chronically ill led the Commission on Chronic Illness and the Public Health Service to join forces in a fact-finding study. To gain the desired insight into the character of nursing homes, the study focused on (*a*) what type of patients are in existing homes and (*b*) what type of care these patients receive.

Thirteen States in various parts of the country elected to participate in the survey conducted during 1953 and 1954. These were: California, Colorado, Connecticut, Georgia, Indiana, Maryland, Minnesota, New Mexico, upstate New York, Oklahoma, Rhode Island, Vermont, and Wyoming. Each State performed its own field work and processed and tabulated the data, employing uniform schedules and procedures which were outlined in a manual. Although a technically representative sample was not devised for the study, the consolidated results were found on examination to

Public Health

MONOGRAPH

No. 46

The accompanying summary covers some of the principal findings presented in Public Health Monograph No. 46, published concurrently with this issue of Public Health Reports. The 13-State survey upon which the report is based was a joint project of the Commission on Chronic Illness and the Public Health Service. At the time of the study, the authors of the monograph were associated with the Commission on Chronic Illness and the Division of Hospital and Medical Facilities, Public Health Service. Three of the authors are currently associated with other health and medical care organizations.

Readers wishing the data in full may purchase copies of the monograph from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. A limited number of free copies are available to official agencies and others directly concerned on specific request to the Public Inquiries Branch of the Public Health Service. Copies will be found also in the libraries of professional schools and of major universities and in selected public libraries.

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Solon, Jerry; Roberts, Dean W.; Krueger, Dean E.; and Baney, Anna Mae: Nursing homes, their patients and their care: A study of nursing homes and similar long-term care facilities in 13 States. Public Health Monograph No. 46 (PHS Publication No. 503). 58 pp. Illustrated. U. S. Government Printing Office, Washington, D. C., 1957. Price 40 cents.

present a fairly adequate picture of the Nation's nursing homes.

Information gathered on the patients included personal data, date of admission to the nursing home, diagnoses as available, nature and extent of disability, nursing and personal services received, physician's care, charges, and sources of funds for payment. In addition, information on the length of time the homes had been in operation, their size, and the number and types of staff employed was also obtained. Data on these factors and their interrelationships are presented in detail in the monograph.

The central focus of the study is the proprietary nursing home, which has increased so rapidly in numbers in the last two decades. To perceive in better perspective the role of this relatively new and now quite numerous type of facility, some of the States also surveyed such similar types of long-term care facilities as nonproprietary (voluntary and public) nursing homes, domiciliary care homes, and chronic disease hospitals.

Types of Patients

The findings of the survey reveal that both similarities and differences exist among these categories of institutions, depending upon the emphasis that is given. Basically, it can be said that all of these types of facilities are alike in an important characteristic: They all serve very aged people, predominantly. A large majority of the people in each type of institution are past 65 years of age. With this similarity, significant differences may nevertheless be observed in the age makeup of patients in the four types of facilities studied. Data for five States which surveyed all categories of facilities show that, whereas in proprietary nursing homes as many as 90 percent of the patients are past 65 years of age, in the chronic disease hospitals only about 65 percent are that old.

With respect to the extent of disability among the patients, proprietary nursing homes and chronic disease hospitals serve the groups who are most disabled; voluntary and public nursing homes, those who are, in general, less disabled; and domiciliary care homes, the least disabled group. This gradient is also reflected in the types and extent of services received in the several categories of facilities. For example, relative to the other facilities, a higher proportion of the patients in proprietary nursing homes and chronic disease hospitals receive various nursing and personal services.

Information on the length of time spent in the facilities up to the date of the survey revealed that the average patient in a proprietary nursing home had already spent about a year in the present home, the shortest period of residence found among the four types of establishments. Patients in chronic disease hospitals and nonproprietary nursing homes had been in these institutions for somewhat longer periods, and the residents of domiciliary care homes had an average stay to date of more than 2 years.

Such long periods of care naturally impose a severe financial drain on many patients and their families. It is therefore not surprising to find that public welfare funds pay for the care of about half of all patients in proprietary nursing homes. Similarly, large proportions receive such assistance in the other types of homes. Although public assistance does not play quite as large a role among patients in the chronic disease hospitals surveyed, other resources, such as voluntary agencies (including those operating hospitals) and public auspices other than public assistance funds, are financing the care of nearly half of the patients in these hospitals.

Staffing and Age of Homes

Nursing homes without professionally trained nurses are very common. Approximately 60 percent of all proprietary nursing homes have not a single professional nurse on their staff. In a few States where licensure requirements specify high staffing standards, however, nursing homes commonly have at least a supervising registered nurse. Interestingly, voluntary and public nursing homes, although their residents are generally less ill and disabled than the group found in proprietary nursing homes, maintain a higher standard—less than one-fifth of the nonproprietary nursing homes do not employ a professional nurse.

That proprietary nursing homes are still a relatively new phenomenon is demonstrated by the recent origin of many of the existing homes.

One-fourth had been established only within the preceding 2 years. Nonproprietary nursing homes, on the whole, date back longer, as do the chronic disease hospitals.

Public Health Monograph No. 46 analyzes these and other major findings for each of the types of facilities surveyed, that is, proprietary nursing homes, nonproprietary (voluntary and public) nursing homes, domiciliary care homes, and chronic disease hospitals. Comparisons are drawn wherever possible among the various groups of establishments. The appendix material includes an examination of the representativeness of the States in the sample and detailed tables giving basic data for each type of facility, by State.

Liability of State as Manufacturer and Distributor of Antitoxin

Gielski v. *State*, 155 N.Y.S. 2d 863 (N.Y. Ct. Cl., 1956) involved a claim against State of New York under the State Court of Claims Act. Claimant suffered injury to his finger and was hospitalized for tetanus. His physician gave him an intraspinal administration of tetanus antitoxin manufactured and distributed by the division of laboratories and research of the New York State Department of Health. Claimant suffered injury as a result of that treatment. He alleged the intraspinal administration was made in reliance on, and in accordance with, a circular published, printed, and distributed by the State containing instructions and directions for use of the tetanus antitoxin and recommending intraspinal administration. It is alleged that the circular was negligently prepared in that medical specialists in treatment of tetanus did not regard intraspinal administration as safe, and that the circular was prepared and circulated with knowledge and intention that the medical profession would rely on and act on the information therein.

Issue: As a prerequisite to the court's further consideration of the claim under the act, it was necessary that the facts show a legal cause of action.

Holding: The court held the allegations (assumed for this purpose to be true) stated a cause of action, saying:

"The manufacture and distribution of an article dangerous to human life and well being if improperly used, imposes an obligation to advise of the manner in which the article may be safely used. *Marcus* v. *Specific Pharmaceuticals, Inc.*, Sup., 82 N.Y.S. 2d 194. Since the obligation to give advice exists it is a necessary corollary that such advice must be given with care. The fact that the instrumentality was distributed only to members of the medical profession for use by them cannot serve to insulate the manufacturer and distributor from liability to the patient as a matter of law. *Wechsler* v. *Hoffman-Laroche, Inc.*, 198 Misc. 540, 99 N.Y.S. 2d 588."

The court referred to a previous ruling in blood plasma cases where use of plasma collected by the Red Cross and distributed by the New York State Department of Health resulted in death. In the plasma cases it was ruled that where the health department acted merely as a distributing agent of a product for which physicians were generally chargeable with knowledge of appropriate circumstances for use (and it was established in the trials that dangers inherent in use of blood plasma are widely known in the medical profession) the State was not liable to give further information or warning to the physician on the use of the product.

The court said in the *Gielski* v. *State* case that up to this point in the proceedings no proof as to the knowledge with which the physician is chargeable concerning the use of tetanus antitoxin had been presented, and a physician is chargeable only with such skill and learning ordinarily possessed by physicians in the locality. The court said the circular gave the appearance of reflecting generally accepted medical practice.

technical publications

National Institutes of Health

PHS Publication No. 81. Revised 1956. 25 pages. 25 cents.

The 1956 revised brochure briefly presents the history and programs of the National Institutes of Health, citing significant advances of the individual institutes, divisions, and the Clinical Center.

Recent changes in the structure of NIH are outlined. These include reorganization and expansion to provide a Division of Biologics Standards, the National Institute of Allergy and Infectious Diseases, the Division of Research Services, and the Division of Business Operations. The last two divisions centralize supportive services at NIH.

The pamphlet is designed to reflect the underlying philosophy of the programs conducted by each NIH component. It also illustrates the integration of these programs and the "team approach" characteristic of medical research today.

Four Decades of Action for Children

Children's Bureau Publication No. 358. 90 pages. 35 cents.

Your Children's Bureau

Children's Bureau Publication No. 357. 48 pages; illustrated. 20 cents.

The history of the Children's Bureau and its current program of action for children are contained in two new publications, primarily designed for the wide spectrum of professional workers and lay leaders who want more than a nodding acquaintance with their Government's services for children.

Four Decades of Action for Children shows how the Bureau's responsibilities have grown from its original mandate of investigating and reporting on the welfare of children to inclusion of assistance to States, through administration of Federal grants, in expanding and improving their services for children.

Your Children's Bureau describes how the bureau presently works to advance the well-being of all children and especially of disadvantaged children, through its own programs and in collaboration with others in and out of Government.

Procedures for Isolation and Identification of the Gonococcus

PHS Publication No. 499. 1956. 36 pages; illustrated

Originally VD Graphic 84, this 1956 reissue of the manual outlines laboratory techniques for isolation of the gonococcus. It describes materials and media used; how specimens are taken from males and females; preparation of smears; procedure for the isolation of the gonococcus by culture and for performing the fermentation test; and, the identification of *Neisseria gonorrhoeae*. A pictorial diagram shows suggested steps to be followed in this latter technique.

Selected References On Cardiovascular Disease

Annotated bibliography for nurses

PHS Publication No. 472. 1956 52 pages. 25 cents.

Compiled as a time-saving guide for nurses, this annotated bibliography on cardiovascular diseases will also be of use to medical students, nutritionists, health educators, social workers, and others in the health field concerned with heart disease.

References are arranged in sections according to major interests in the field such as rehabilitation, emotional aspects, and patient education. Films and other audiovisual aids are also listed.

The Child Who Is Mentally Retarded

Children's Bureau Folder No. 43. 23 pages; illustrated. 10 cents.

The latest in a series of folders addressed to parents whose children have crippling conditions, "The Child Who Is Mentally Retarded" sets forth some of the home training that parents can give a retarded child. It stresses the fact that retarded children have the same feelings as other children and that most are as sensitive as any other child.

The folder emphasizes, as a springboard for planning, the value of a thorough diagnostic evaluation for a child who appears to be mentally retarded. It also outlines some of the factors which parents would want to consider in deciding either to keep the child at home or place him away from home.

Also described are some of the community agencies and national groups to which parents may turn for help with their individual problems.

This section carries announcements of all new Public Health Service publications and of selected new publications on health topics prepared by other Federal Government agencies.

Publications for which prices are quoted are for sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. Orders should be accompanied by cash, check, or money order and should fully identify the publication. Public Health Service publications which do not carry price quotations, as well as single sample copies of those for which prices are shown, can be obtained without charge from the Public Inquiries Branch, Public Health Service, Washington 25, D. C.

The Public Health Service does not supply publications issued by other agencies.

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